





Washington Annual Report on Conservation Acquisition

January 1, 2018 – December 31, 2018

Final

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PACIFIC POWER
A DIVISION OF PACIFICORP

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List of Abbreviations and Acronyms

BPA	Bonneville Power Administration
CFL	Compact Fluorescent Lighting
DSM	Demand-side Management
Schedule 191	Schedule 191 System Benefits Charge Adjustment
EM&V	Evaluation, Measurement & Verification
GWh	Gigawatt-hour(s)
HVAC	Heating, Ventilation and Air Conditioning
IRP	Integrated Resource Plan
kWh	Kilowatt-hour
LED	Light-emitting Diode
MW	Megawatt
MWh	Megawatt-hour
NEEA	Northwest Energy Efficiency Alliance
NEF	National Energy Foundation
NTG	Net-to-Gross
PCT	Participant Cost Test
PTRC	PacifiCorp Total Resource Cost test
RIM	Ratepayer Impact Measure test
TRC	Total Resource Cost test
UCT	Utility Cost Test
VFD	Variable-Frequency Drive

Executive Summary

PacifiCorp is a multi-jurisdictional electric utility providing retail service to customers in Washington, California, Idaho, Oregon, Utah, and Wyoming. Pacific Power & Light Company (Pacific Power or Company), a division of PacifiCorp, serves approximately 130,000 customers in Washington. The Company works with its customers to reduce the need for investment in supply side resources and infrastructure by reducing energy consumption and peak demand through cost effective energy efficiency programs.

The Company is required to comply with the requirements of the Energy Independence Act (also known as I-937) codified in RCW19.285 and WAC 480-109. This report provides information on the Company's 2018 activities and expenditures related to pursuing all conservation in accordance with the I-937 framework, including Washington Utilities and Transportation Commission (Commission) orders and administrative rules.

In 2018, the Company offered four energy efficiency programs in Washington and received energy savings and market transformation benefits through its affiliation with the Northwest Energy Efficiency Alliance (NEEA). The Company recovers expenditures associated with these programs through the System Benefits Charge Adjustment, Schedule 191.

This report also provides details on Schedule 191 revenue for the performance period from January 1, 2018, through December 31, 2018. The Company, on behalf of its customers, invested $11m in energy efficiency information, services, and incentives during the reporting period. The investment yielded approximately 55 gigawatt-hours (GWh) in first year savings[1] and approximately 9.0 megawatts (MW) of energy efficiency savings related capacity reductions.[2] Net benefits over the life of the individual measures are estimated at $5.1m.[3]

The portfolio was cost effective based on four of the five standard cost effectiveness tests for the reporting period. The ratepayer impact measure test was less than 1.0, indicating near-term upward pressure was placed on the price per kilowatt-hour (kWh) given a reduction in sales. The cost effectiveness of the Company's Washington energy efficiency program portfolio from various perspectives is provided in Table 1 below.

[1] Gross reported savings at the generation.
[2] See Energy Efficiency section for explanation on how the capacity contribution savings values are calculated.
[3] See Appendix 1 – Table 8 - 2018 Total Portfolio Cost Effectiveness Results (including NEEA and NEBs) – Total Resource Cost Test (PTRC) + Conservation Adder.

Table 1
Cost Effectiveness for the Portfolio[4]

Benefit/Cost Test	B/C Ratio with NEEA	B/C Ratio without NEEA
PacifiCorp Total Resource Cost Test (PTRC) plus 10%[5]	1.33	1.30
Total Resource Cost (TRC) Test[6]	1.22	1.19
Utility Cost Test (UCT)[7]	1.67	1.66
Participant Cost Test (PCT)[8]	4.22	3.92
Ratepayer Impact Cost Test (RIM)[9]	0.37	0.37

All cost effectiveness calculations assume a net-to-gross (NTG) of 1.0, consistent with the Northwest Power and Conservation Council's methodology. Portfolio level cost effectiveness includes portfolio costs such as the Process and Impact Evaluations, Class 2 demand-side management (DSM) Potentials Assessment, End Use Load Research and the DSM system database. Consistent with the Northwest Power and Conservation Council's methodology, the Company includes quantifiable non-energy benefits at the portfolio and residential level, as well as the *Home Energy Savings* and *Low Income Weatherization* program levels. *Low Income Weatherization* is not included in the portfolio or sector-level cost effectiveness analysis per WAC 480-109-100(10)(b). Appendix 1 provides 2018 cost effectiveness performance.

[4] Ratios include select quantifiable and directly attributable Non-Energy Impacts, but excludes costs as outlined in the Company's EM&V Framework (e.g. Class 1 & 3 of the potential study).
[5] The PTRC includes the 10 percent conservation benefit and risk adder in addition to quantifiable and directly attributable non-energy benefits. PTRC is consistent with the Northwest Power Council's cost effectiveness methodology and complies with the cost effectiveness definition (RCW 80.52.030(7)).
[6] The TRC compares the total cost of a supply side resource to the total cost of energy efficiency resources, including costs paid by the customer in excess of the program incentives. The test is used to determine if an energy efficiency program is cost effective from a total cost perspective.
[7] The UCT compares the total cost incurred by the utility to the benefits associated with displacing or deferring supply side resources.
[8] The PCT compares the portion of the resource paid directly by participants to the savings realized by the participants.
[9] The RIM examines the impact of energy efficiency expenditures on non-participating ratepayers overall. Unlike supply-side investments, energy efficiency programs reduce energy sales. Reduced energy sales can lower revenue requirements while putting upward pressure on rates as the remaining fixed costs are spread over fewer kilowatt-hours.

Compliance

An external conservation advisory group of stakeholders is required to be maintained and used by the Company to advise it about conservation issues including program designs, incentive levels, third party evaluations, program marketing, and pilots. WAC 480-109-110 provides the scope of issues for the advisory group. The Company refers to its conservation advisory group as the Washington DSM Advisory Group. Meetings are typically held at the Commission offices in Olympia and include a call-in number so stakeholders can participate remotely.

In compliance with I-937, the Company continuously reviews and updates, as appropriate, the conservation programs and portfolio to adapt to changing market conditions. Steps taken to adaptively manage the conservation programs during 2018 are included within program specific sections of this report. In the *Home Energy Savings* program, efforts were made to engage a local contractor to deliver duct sealing services, transition delivery of the new homes offer to NEEA's AXIS platform and develop a focused ductless heat pump offer for manufactured homes customers. In the *wattsmart Business* program, changes were made to improve program cost effectiveness by adding a maximum payback requirement, move lamp replacement incentive offer to mid-market and remove non-cost effective measures from the program.

Pilot projects are implemented when appropriate and are expected to be cost effective within the current or immediately subsequent biennium as long as the overall portfolio remains cost effective. The Company, after consultation with its DSM Advisory Group, offers initiatives or offers within two programs: *Home Energy Savings* and *wattsmart Business*. This focus is administratively efficient and uses existing program awareness—both important considerations in the Company's rural territory. To further leverage other efforts, the Company has linked its pilot efforts with regional work supported by NEEA whenever possible.

Regulatory Activities

During the 2018 reporting period, the Company filed a number of compliance and/or informational reports, updates, and requests with the Commission and Department of Commerce in support of Company DSM programs. The following is a list of those filings:

- January 17, 2018 – Compliance Filing – Order 01 in Docket UE-171092 to revise PacifiCorp's 2018-2019 Biennial Conservation Plan to revise the Biennial Conservation Target.
- February 27, 2018 – Updated 2017 Annual Conservation Plan and 2016 Washington Annual Report on Conservation Acquisition (Docket UE-152072).
- June 1, 2018 – Washington Annual Report on Conservation Acquisition for 2017 (Docket UE 152072. The report provides details on program results and activities.
- June 1, 2018 – 2016-2017 Biennial Conservation Report (Docket UE-152072) including replacement pages submitted July 6, 2018.
- June 1, 2018 - 2016-2017 Conservation Report to Department of Commerce (Docket UE-152072). The report detailed the Company's progress in meeting the targets established in RCW 19.285.040 (EIA requirements).
- June 1, 2018 – Schedule 191-System Benefits Charge adjustment, UE-180493, to decrease Schedule 191 by approximately $1.75 million (from $13.9m to $12.15m).
- November 15, 2018 – PacifiCorp's 2019 Annual Conservation Plan in Docket UE-171092.

Advisory Group Activities

At least four times per year, the Company seeks input regarding its energy efficiency programs from its Washington DSM Advisory Group. This group includes representatives from a variety of constituent organizations. In addition to the DSM Advisory Group meetings, in 2018, the Company participated in seven Statewide Advisory Group (SWAG) meetings. The work involved in these meetings was significant and focused on issues common to all utilities and their stakeholders. During the last half of the year, the Company, after informal discussions with some, but not all members of the DSM Advisory Group, elected to focus resources on the SWAG meetings instead of convening a fourth DSM Advisory Group meeting. The Company collaborated with its DSM Advisory Group throughout 2018 on the following matters:

June 25, 2018

- Review of 2017 performance and 2016-2017 biennial period
- Home Energy Reports evaluation results, delivery transition
- SBW Savings Verification Report
- Pilot updates
- Evaluation update

October 26, 2018

- Draft 2019 Annual Conservation Plan
- 2019 program changes preview

- Ductless Heat Pump wood smoke analysis update
- Production efficiency work plan
- Demand response funding
- Other topics – Yakama Nation Tribal Council resolution
- Other topics – Street lighting upgrades

December 21, 2018

- Communications and outreach plan review
- Home Energy Reports update
- Collection rate/balancing account analysis update
- Street lighting update

Statewide Advisory Group Meetings

In addition to the DSM Advisory Group meetings, the Company participated in seven Statewide Advisory Group (SWAG) meetings.

Topics discussed:

1. Develop a recommendation for the treatment of NEEA Savings in or out of the Energy Independence Act (EIA) target:

   "We accept PSE's calculation of its conservation target, but require the Companies to form a joint advisory group with all stakeholders, including the Department of Commerce, to engage in further discussions about whether NEEA savings should be included in conservation target calculations going forward."[10]

   "(…) those discussions should address whether to include the various subsets of NEEA savings, whether the EIA requires that NEEA savings be included in target calculations, consistency with target setting requirements for consumer-owned utilities, and the degree of control the Companies have over NEEA's execution of its programs."[11]

2. Discuss potential performance incentives:

   "(…) the Company suggests conducting a workshop in a statewide collaborative setting. This may be a useful exercise and Staff proposes a joint advisory group meeting halfway through the biennium to discuss this, as well as any other common issues."[12]

[10] Commission Order 01, Docket UE-171087 [P.7]
[11] Ibid. [P.7]
[12] Commission Staff Comments Regarding Electric Utility Conservation Plans; Dockets: UE-171087, UE-171091, UE- 171092 [P.10]. The utility cited is Puget Sound Energy. The Company was in agreement with the suggestion.

3. Identify areas of improvement to UTC cost-effectiveness methodology by investigating Resource Value Framework (RVF).

   "Staff strongly agrees that the NSPM should be followed in a collaborative process to identify areas of improvement to UTC cost-effectiveness methodology. Staff suggests that any such comprehensive process commence after the conclusion of the Commission's current integrated resource plan (IRP) rulemaking in Docket U-161024."[13]

Meeting dates:

- January 24, 2018
- March 30, 2018
- May 18, 2018
- June 29, 2018
- August 3, 2018
- September 7, 2018
- December 7, 2018

[13] Ibid. [P.10]

DSM Expenditures

System Benefits Charge Balancing Account Summary

DSM activities are funded through Schedule 191, the System Benefits Charge Adjustment collections. Expenditures are charged as incurred and collected through Schedule 191. The balancing account is the mechanism used for managing the revenue collected and expenses incurred in the provision of DSM resources. The balancing account activity for 2018 is outlined in Table 2. The end of year balance in the balancing account, on an accrual basis, was an over-collection of $1,839,248.

Table 2
System Benefit Charge Balancing Account Summary

Month	Deferred Expenditures	Revenue Collected	Accumulative Balance	Monthly Net Accrued Costs	Accrual Basis Accumulative Balance
Dec-17			$ (1,042,081)	$ 1,133,685	$ 91,604
Jan-18	$ 782,124	$ (1,402,608)	$ (1,662,565)	$ 36,425	$ (492,455)
Feb-18	$ 615,787	$ (1,181,694)	$ (2,228,472)	$ (210,505)	$ (1,268,867)
Mar-18	$ 1,175,327	$ (1,132,853)	$ (2,185,999)	$ (152,348)	$ (1,378,741)
Apr-18	$ 683,461	$ (959,094)	$ (2,461,631)	$ 247,621	$ (1,406,753)
May-18	$ 1,058,053	$ (987,167)	$ (2,390,745)	$ (419,742)	$ (1,755,608)
Jun-18	$ 746,766	$ (982,775)	$ (2,626,754)	$ 100,779	$ (1,890,838)
Jul-18	$ 721,561	$ (1,156,302)	$ (3,061,496)	$ 69,845	$ (2,255,735)
Aug-18	$ 1,097,712	$ (1,226,722)	$ (3,190,506)	$ (151,891)	$ (2,536,636)
Sep-18	$ 853,003	$ (1,020,475)	$ (3,357,978)	$ 147,075	$ (2,557,033)
Oct-18	$ 748,294	$ (895,194)	$ (3,504,877)	$ 146,870	$ (2,557,063)
Nov-18	$ 1,305,631	$ (941,637)	$ (3,140,884)	$ (196,886)	$ (2,389,956)
Dec-18	$ 1,463,386	$ (1,162,219)	$ (2,839,716)	$ 249,540	$ (1,839,248)
TOTAL	**$ 11,251,105**	**$ (13,048,740)**		**$ 1,000,469**	

Note: December 2018 Accrual was $1,000,469.

Column Explanations:

Deferred Expenditures: Monthly expenditures for all program activities posted in 2018, including funding for the Northwest Energy Efficiency Alliance.

Revenue Collected: Revenue collected through Schedule 191, System Benefits Charge Adjustment.

Accumulative Balance: A running total of account activities on a "cash" basis. A negative accumulative balance means cumulative revenue exceeds cumulative expenditures; positive accumulative balance means cumulative expenditures exceed cumulative revenue.

Monthly Net Accrued Costs: Two accrual entries are made each month for expenditures of energy efficiency programs. One estimates the incurred cost not yet processed, and the other reverses the estimate from the previous month. The amount shown here is the net of the two entries.

Accrual Basis Accumulative Balance: Current balance of account including accrued costs.

Planning Process

Integrated Resource Plan

The Company develops a biennial integrated resource plan (IRP) as a means of balancing cost, risk, uncertainty, supply reliability/deliverability and long-run public policy goals.[14] The plan presents a framework of future actions to ensure the Company continues to provide reliable, reasonably priced service to customers. Energy efficiency and peak management opportunities are incorporated into the IRP based on their availability, characteristics and costs.

PacifiCorp divides energy efficiency and peak management resources into four general classes:

- **Class 1 DSM—Resources from fully dispatchable or scheduled firm capacity product offerings/programs—**Class 1 DSM programs are those for which capacity savings occur as a result of active Company control or advanced scheduling. Once customers agree to participate in a Class 1 DSM program, the timing and persistence of the load reduction is involuntary on their part within the agreed upon limits and parameters of the program. Program examples include residential and small commercial central air conditioner load control programs that are dispatchable, and irrigation load management and interruptible or curtailment programs (which may be dispatchable or scheduled firm, depending on the particular program design or event noticing requirements).

- **Class 2 DSM—Resources from non-dispatchable, firm energy and capacity product offerings/programs—**Class 2 DSM programs are those for which sustainable energy and related capacity savings are achieved through facilitation of technological advancements in equipment, appliances, lighting and structures, or repeatable and predictable voluntary actions on a customer's part to manage the energy use at their facility or home. Class 2 DSM programs generally provide financial or service incentives to customers to improve the efficiency of existing or new customer-owned facilities through: (1) the installation of more efficient equipment, such as lighting, motors, air conditioners, or appliances; (2) upgrading building efficiency through improved insulation levels, windows, etc.; or (3) behavioral modifications, such as strategic energy management efforts at business facilities and home energy reports for residential customers. The savings endure (are considered firm) over the life of the improvement or customer action. Program examples include comprehensive commercial and industrial new and retrofit energy efficiency programs, comprehensive home improvement retrofit programs, strategic energy management and home energy reports.

- **Class 3 DSM—Resources from price responsive energy and capacity product offerings/programs—**Class 3 DSM programs seek to achieve short-duration (hour by hour) energy and capacity savings from actions taken by customers voluntarily, based on a financial incentive or signal. Program examples include time-of-use pricing plans, critical peak pricing plans, and inverted block tariff designs.. As a result of their voluntary nature,

[14] Information on the Company's integrated resource planning process can be found at the following address: http://www.pacificorp.com/es/irp.html

participation tends to be low and savings are less predictable, making Class 3 DSM resources less suitable to incorporate into resource planning, at least until their size and customer behavior profile provide sufficient information for a reliable diversity result (predictable impact) for modeling and planning purposes. Savings typically only endure for the duration of the incentive offering and, in many cases, loads tend to be shifted rather than being avoided. The impacts of Class 3 DSM resources may not be explicitly considered in the resource planning process; however, they are captured naturally in long-term load growth patterns and forecasts.

- **Class 4 DSM—Non-incented behavioral-based savings achieved through broad energy education and communication efforts—**Class 4 DSM programs promote reductions in energy or capacity usage through broad-based energy education and communication efforts. The program objectives are to help customers better understand how to manage their energy usage through no-cost actions such as conservative thermostat settings and turning off appliances, equipment and lights when not in use. The programs are also used to increase customer awareness of additional actions they might take to save energy and the service and financial tools available to assist them. Class 4 DSM programs help foster an understanding and appreciation of why utilities seek customer participation in Classes 1, 2 and 3 DSM programs. Similar to Class 3 DSM resources, the impacts of Class 4 DSM programs may not be explicitly considered in the resource planning process; however, they are captured naturally in long-term load growth patterns and forecasts. Program examples include Company brochures with energy savings tips, customer newsletters focusing on energy efficiency, case studies of customer energy efficiency projects, and public education and awareness programs.

Class 1 and 2 DSM resources are included as resource options in the resource planning process. Class 3 and 4 DSM actions are not considered explicitly in the resource planning process, however, the impacts are captured naturally in long-term load growth patterns and forecasts.

As technical support for the IRP, the Company engages a third-party consultant to conduct a DSM Potential Assessment (Potential Assessment). [15] The study primarily seeks to develop reliable estimates of the magnitude, timing and cost of DSM resources likely available to PacifiCorp over the 20-year planning horizon of the IRP. The main focus of the Potential Assessment is on resources with sufficient reliability characteristics that are anticipated to be technically feasible and considered achievable during the IRP's 20-year planning horizon. By definition, the estimated achievable technical potential is the energy efficiency potential that may be achievable to acquire during the 20-year planning horizon prior to cost-effectiveness screening.

The achievable technical potential of Class 2 (energy efficiency) resources for Washington by sector is shown in Table 3. The 2017 Potential Assessment indicates that approximately nine

[15] PacifiCorp's Demand-side Resource Potential Assessments can be found at http://www.pacificorp.com/es/dsm.html.

percent of the achievable technical potential for the Company, excluding Oregon[16], is available within its Washington service area.[17]

Table 3
Washington Energy Efficiency Achievable Technical Potential by Sector[18]

Sector	Cumulative GWh in 2036	Percent of Baseline Sales
Residential	347	20%
Commercial	403	22%
Industrial	73	13%
Irrigation	14	8%
Street Lighting	5	41%

Demand-side resources vary in their reliability, load reduction and persistence over time. Based on the significant number of measures and resource options reviewed and evaluated in the Potential Assessment, it is impractical to incorporate each as a stand-alone resource in the IRP. To address this issue, Class 2 DSM measures and Class 1 DSM programs are bundled by cost for modeling against competing supply-side resource options which reduces the number of discrete resource options the IRP must consider to a more manageable number.

Cost Effectiveness

The Company evaluates program implementation cost effectiveness (both prospectively and retrospectively) under a variety of tests to identify the relative impact and/or value (*e.g.*, near-term rate impact, program value to participants, etc.) to customers and the Company. Program cost effectiveness is performed using a Company specific modeling tool, created by a third party consultant. The tool is designed to incorporate PacifiCorp data and values such as avoided costs, and assesses the costs and benefits of DSM resource programs from different stakeholder perspectives, including participants and non-participants, based on four tests described in the Standard Practice Manual (TRC, UCT, PCT and RIM) as well as an additional fifth test, PTRC. Washington utilizes the PTRC as the primary cost effectiveness test.

As specified in WAC 480-109-100 (8) "A utility's conservation portfolio must pass a cost effectiveness test consistent with that used in the Northwest Conservation and Electric Power Plan. A utility must evaluate conservation using the cost effectiveness test consistent with those used by the council and as required by the commission except as provided by WAC 480-109-100 (10).

The Northwest Power and Conservation Council's Seventh Power Plan provides information on cost effectiveness on page G-11 of Appendix G. "The Council uses the total resource net levelized cost (TRC net levelized cost) for its analysis of the cost of the conservation measures, which is

[16] Oregon energy efficiency potentials assessments are performed by the Energy Trust of Oregon.
[17] http://www.pacificorp.com/es/dsm/dpssm.html Volume 1, Table 2-1, PacifiCorp Demand-Side Resource Potential Assessment for 2017-2036.
[18] Volume 2, Tables 4-4, 4-6, 4-8, 4-10, 4-11, PacifiCorp Demand-Side Resource Potential Assessment for 2017-2036.

similar to the Societal Cost Test outlined in the National Action Plan for Energy Efficiency[19] and the California Standard Practice Manual."

The National Energy Efficiency Screening project published the National Standard Practice Manual (NSPM)[20] to provide a comprehensive framework for assessing the cost-effectiveness of energy efficiency resources. The NSPM provides guidance that incorporates lessons learned over the past 20 years, responds to current needs, and addresses and takes into account the relevant policies and goals of each jurisdiction undertaking efficiency investments. The NSPM presents an objective and neutral Resource Value Framework that can be used to define a jurisdiction's *primary* cost-effectiveness test, which is referred to as a Resource Value Test.

The PacifiCorp Total Resource Cost (PTRC) test results in the Navigant analysis include the 10 percent Conservation Adder and quantifiable non-energy benefits and is analogous to the Societal Cost Test (SCT) referenced by the Council.

In combination with WAC rules and in approving Pacific Power's 2018-2019 Biennial Conservation Plan,[21] the WUTC has established cost-effectiveness tests for Pacific Power to use in planning for and pursuing conservation resources. Per the definition above from the NSPM, the Total Resource Cost test, as modified by the Northwest Power and Conservation Council, *is* the current RVT for Washington investor-owned utilities.

During 2018, the Statewide Advisory Group considered further areas of improvement to Commission approved cost-effectiveness methodology by investigating updates based on the Resource Value Framework (RVF). The group reviewed current practices and compiled methodologies in order to outline areas of consistency. Commission Staff compiled a list of applicable policy goals based on their review of Washington statutes implemented by the UTC. Utility system costs and benefits were reviewed. The group also discussed non-utility costs and benefits and worked collaboratively to determine which additional non-utility system costs and benefits to potentially include in the RVT. At this time a proposal for RVT is on-hold pending the completion of the IRP Rulemaking in docket U-161024 and the outcome of the current legislative session.

[19] https://www.epa.gov/sites/production/files/2015-08/documents/cost-effectiveness.pdf
[20] https://nationalefficiencyscreening.org/wp-content/uploads/2017/05/NSPM_May-2017_final.pdf
[21] Docket UE-171092, Order 01 Attachment A (8) (January 12, 2018).

Energy Efficiency Programs

The Company offered energy efficiency programs to all major customer sectors: residential, commercial, industrial, and agricultural. The Company's energy efficiency portfolio included four programs: *Home Energy Savings*, Schedule 118*; Home Energy Reports; Low Income Weatherization*, Schedule 114*;* and *Non-Residential Energy Efficiency* (*watt*smart Business), Schedule 140. The Company also helps fund NEEA. In addition to the energy efficiency programs, the Company, on behalf of customers, invested in outreach and education for the purpose of promoting the efficient use of electricity and improving program performance. Results for 2018 are provided in Table 4.

Table 4
Washington Results January 1, 2018 – December 31, 2018

Program	kWh/Yr Savings (at site)	kWh/Yr Savings (at generator)	Systems Benefits Charge Expenditures
Low Income Weatherization	182,237	199,859	$ 929,323
Home Energy Savings	6,489,387	7,116,910	$ 2,054,828
Home Energy Reports	9,816,840	10,766,128	$ 334,578
Total Residential Programs	**16,488,464**	**18,082,898**	**$ 3,318,729**
wattsmart Business Agricultural	388,369	425,924	$ 92,248
wattsmart Business Commercial	23,721,991	25,982,934	$ 4,512,840
wattsmart Business Industrial	7,116,153	7,696,902	$ 1,477,305
Total Business Programs	**31,226,512**	**34,105,760**	**$ 6,082,393**
Northwest Energy Efficiency Alliance	2,935,149	3,216,604	$ 859,487
Total	**50,650,125**	**55,405,262**	**$ 10,260,608**
		Process & Impact Evaluation	$ 318,975
		Class 2 Potential Study	$ 102,029
		System Support	$ 26,943
		End Use Load Research	$ 35,082
		School Energy Education	$ 63,679
		Outreach and Communication	$ 224,854
		Total Portfolio Level Expenditures	**$ 771,563**
		Total System Benefits Charge expenditures	**$ 11,032,171**

In 2018, the Company delivered preliminary results of 55,405 MWh in first year energy savings at generation against the 2018 Business Plan, while operating within approximately 99% of forecasted expenditures. Changes in the variance between forecasted and actuals are detailed below.

Key Changes in the Savings Forecast

- Home Energy Savings results were 20% less than forecast. Actual lighting savings were less than forecasted and it continues to decline as fewer replacement lamps are sold and the lamps deliver lower savings. This trend is part of the continued shift to long lasting LED's and an increase in efficient equipment in the current practice baseline used to measure savings. Non-lighting activity was higher than forecasted, primarily as the result of increased ductless heat pump installations and manufactured home duct sealing. Energy savings kits have also declined.

- Home Energy Reports: 2018 savings are approximately 13% higher than those included in the November 2018 Business Plan. These higher savings are based on current information provided by Bidgely, the program implementer. Savings in 2018 reflect actions taken by customers already enrolled in the program at the end of 2017 during two periods; between January through August when customers did not receive reports, and between September and December when customers received the new report which included end use disaggregation. The actual 2018 savings are higher than the 2018 forecast provided in the 2019 Annual Conservation Plan. All reported savings for the 2018 period is based on analysis of billing data by Bidgely.

- *wattsmart* Business: 2018 savings were higher than forecasted and was primarily due to increased lighting savings as business customers increasingly upgrade to LEDs as costs decline.

- NEEA: Revised savings estimates from NEEA (using the same methodology and baselines used to establish the original forecast) indicate that savings are down by approximately 8%. The heat pump water heaters, Certified Refrigeration Energy Specialist, and Commissioning initiatives generated the most significant variances.

Key Changes in the Expenditure Forecast

- Low Income Weatherization: Additional costs were incurred with a recently added community action agency beginning to complete homes in Pacific Power's territory. In addition, a larger number of projects were fully funded by the Company.

- Home Energy Savings: The expenditure is three percent lower than the original forecast which is materially less than the 20% reduction in the energy savings. Incentive costs increased as non-lighting measures like heat pumps and duct sealing replace lower cost measures such as lighting. Delivery costs increased, reflecting the complexity required to deliver the increasing share of non-lighting measures.

- Home Energy Reports: Delivery costs were greater than the forecast in the 2018 Business plan which were based on proposal information available in late 2017.

- wattsmart Business: Actual expenditures were lower in 2018 compared to the 2018 Business Plan. One driver of the reduction was lower program incentive payments due to customer projects being completed with lower costs than originally estimated. Additionally, the program has multiple delivery channels that vary in terms of savings acquisition costs. In the updated forecast, savings from lower cost delivery channels (such as midstream lighting) offset some savings from higher cost delivery channels.

- Program evaluation (and savings verification): Costs are lower based on timing of evaluation activities and recent re-procurement of key program evaluation activities for the biennial period.

Consistent with requirements under WAC 480-109-120 (3)(b)(ii) and (iii), Table 5 provides a comparison of the Company's 2018 Business Plan filed on November 1, 2017, to actual 2018 program performance.

Table 5
Washington 2018 Annual Conservation Plan compared to Actual

	2018 PacifiCorp Washington Annual Conservation Plan			2018 PacifiCorp Washington DSM Actual		
Program	**kWh/Yr Savings (at site)**	**kWh/Yr Savings (at generation)**	**Estimated Systems Benefit Expenditures**	**kWh/Yr Savings (at site)**	**kWh/Yr Savings (at generation)**	**Systems Benefits Charge Expenditures**
Low Income Weatherization	152,592	167,348	$ 709,000	182,237	199,859	$ 929,323
Home Energy Savings	8,098,314	8,881,421	$ 2,118,789	6,489,387	7,116,910	$ 2,054,828
Home Energy Reports	8,700,000	9,541,290	$ 226,390	9,816,840	10,766,128	$ 334,578
Total Residential Programs	**16,950,906**	**18,590,059**	**3,054,179**	**16,488,464**	**18,082,898**	**3,318,729**
wattsmart Business Agricultural	756,049	829,159	$ 183,185	388,369	425,924	$ 92,248
wattsmart Business Commercial	12,720,550	13,932,946	$ 3,200,028	23,721,991	25,982,934	$ 4,512,840
wattsmart Business Industrial	11,734,582	12,692,241	$ 2,762,998	7,116,153	7,696,902	$ 1,477,305
Total Business Programs	**25,211,181**	**27,454,346**	**6,146,211**	**31,226,512**	**34,105,760**	**6,082,393**
Northwest Energy Efficiency Alliance	**3,196,627**	**3,501,840**	**$ 879,488**	**2,935,149**	**3,216,604**	**$ 859,487**
TOTAL	**45,358,714**	**49,546,245**	**$ 10,079,878**	**50,650,125**	**55,405,262**	**$ 10,260,608**
Portfolio Evaluation			$ 446,895			$ 318,975
Portfolio Potential Study			$ 140,540			$ 102,029
Portfolio Support Summary			$ 32,785			$ 26,943
School Energy Education			$ 60,000			$ 63,679
Outreach and Communication			$ 250,000			$ 224,854
End Use Load Research			$ 41,762			$ 35,082
Total System Benefits Charge Expenditures			**$ 11,051,860**			**$ 11,032,171**

Estimated Peak Contributions

The Company estimates its capacity reduction during PacifiCorp's system peak period from the 2018 energy efficiency portfolio. An energy-to-capacity conversion factor, developed from Class 2 DSM selections in the 2017 IRP, is used to translate 2018 energy savings to estimated demand reduction during the system peak. The use of this factor in the MW calculation assumes that the energy efficiency resources acquired through the Company's programs have the same average load profile as those energy efficiency resources selected in the 2017 IRP.

Table 6
Estimated Peak Contribution

Description	Value
First year Energy Efficiency program MWh savings acquired during 2018 (@ Generation)	55,405
Conversion factor: Coincident MW/MWh	0.000161516
Estimated coincident peak MW contribution of 2018 Energy Efficiency acquisitions	8.95

Direct Benefits to Customers

Estimates of direct benefits to customers delivered from 2018 expenditures are provided in Table 7. This additional metric to assess program impacts is consistent with conversations between Commission Staff and the Company that occurred during the preparation of the 2018 annual conservation plan.

Table 7
2018 Direct Benefits to Customers

Prorgam or Initiative	Expenditures	Direct Benefit to Customers	Direct Benefit to Customers
Low Income Weatherization	$ 929,323	$ 789,214	85%
Home Energy Savings	$ 2,054,828	$ 1,151,709	56%
Home Energy Reports	$ 334,578		
Total Residential Programs	**$ 3,318,729**		
wattsmart Business Agricultural	$ 92,248		
wattsmart Business Commercial	$ 4,512,840		
wattsmart Business Industrial	$ 1,477,305		
Total Business Programs	**$ 6,082,393**	$ 3,783,229	62%
Northwest Energy Efficiency Alliance	$ 859,487	$ 586,674	68%
TOTAL	**$ 10,260,608**		
Portfolio Evaluation	$ 318,975		
Portfolio Potential Study	$ 102,029		
Portfolio Support Summary	$ 26,943		
School Energy Education	$ 63,679		
Outreach and Communication	$ 224,854		
End Use Load Research	$ 35,082		
Total System Benefits Charge Expenditures	**$ 11,032,171**	**$ 6,310,825**	**57%**

Notes:

Low Income Weatherization: In 2018 payments to community action agencies for measure installation were classified as incentives. The value can be found in the cost effectiveness tables included in Appendix 1.

Home Energy Savings: Customer incentives, upstream, mid-stream and mail by request buy downs are included in the direct benefit to customer calculation. This information is provided in the incentives column for the Home Energy Savings program in Appendix 1.

wattsmart Business: Customer incentives and expenditures for customer site specific energy engineering and inspections included in the direct benefit to customer calculation. Both amounts are provided in Appendix 1.

NEEA: Company subtracted $21,382 in internal management costs and then applied the 70% estimate provided by staff to NEEA funding to calculate the direct benefit to customers.

Pilot Projects

The Company offers pilot projects to residential and nonresidential sectors. This section briefly describes the pilots underway in the biennial period and key activities that occurred in 2018.

On-Bill Financing for residential customers

- **Purpose**: Reduce upfront cost barrier to participation in residential energy efficiency programs by offering on-bill financing for 2018-2019. The residential offer complements the third party financing already in place for our business customers.
- **Costs**: Start-up costs of $30,000 will be paid in 2019 and included as a residential program expenses and recovered through the tariff rider. Pacific Power internal on-going loan administration costs were not assessed in 2018. When internal costs are assessed, they will be included as a program expense and recovered through the tariff rider.
- **Size**: Expected to be 150-200 loans for the 2018-2019 period.
- **Implementation**: Build upon experience from Oregon using a specialized firm, Craft3, to operate as funder and loan administrator for Home Energy Savings program participants. Similar to Oregon, Pacific Power will provide on-bill servicing functions. Financing will be available for the net (after incentives) costs of equipment eligible for incentives through HES program. There will not be a utility service disconnect option for collection or security purposes. Partial payments will be applied to the utility bill first giving Pacific Power payment priority.
- **Marketing**: The offer will be marketed primarily through contractors and the Home Energy System program administrator. Craft3 will identify and train contractors. Marketing and screening will be put in place to help insure customers eligible for low income services are directed to the community action agencies instead of participating in the loan offer. Craft3 is exploring whether an offer for customers who own a manufactured home, but rent space from a manufactured home park owner could be designed.
- **2018 activity**: Group and individual training conducted with trade allies and Sustainable Living Center in Walla Walla. Training included information on services for income qualified customers. There were 81 applications received; 59 approved, 51 active loans (funded and billing), 13 applications declined and 6 applications withdrawn. Exploration

of an offer for owned manufactured homes on rented space is on-going and progress will provided in a future 2019 DSM Advisory Group meeting.

Heat pump dryers

- **Purpose:** Increase stocking, sales and incentive applications for heat pump dryers within Pacific Power's territory. Equipment eligibility aligns with NEEA's Qualified Products List (QPL).
- **Costs:** Additional administrative budget of approximately $6,000. Included in Home Energy Savings program delivery costs for the biennial period.
- **Size:** Twelve to 24 units.
- **Implementation:** Home Energy Savings program team in combination with NEEA. The initiative focuses on smaller retailers with faster decision processes and is a continuation of the work started in 2017. Continue the work in partnership with NEEA to secure preferred pricing and expedited shipping.
- **Marketing:** Continue sales training and enhanced outreach to smaller independent retailers. Provide a sales performance incentive fund (SPIF) and pay participating sales associates $50 for every qualifying model sold.
- **2018 report**: loss of NEEA mid-market incentive and loss of retailer interest have materially affected this pilot. Field staff increased outreach to selected retailers who ultimately did not stock any units because of the higher cost and perceived lack of consumer interest. There were no customer incentive requests for this measure in 2018. Increasing the incentive to $600 as part of 2019 program changes is intended to be simple and address the stated objection (from the retailers) to higher costs in a cost sensitive market.

Manufactured Homes Targeted Delivery

- **Purpose:** Increase installation of energy efficiency measures within existing manufactured homes.
- **Costs:** To be determined from Request for Proposal (RFP) responses and cost effectiveness analysis.
- **Size:** To be determined from RFP responses and cost effectiveness analysis.
- **Implementation:** An RFP process was issued within Home Energy Savings program. Proposals were evaluated for cost effectiveness inside proposed (2018-2019) Home Energy Savings program.
- **Marketing:** Third party(s) if selected through RFP process, program administrator, installing contractors and park owners.
- **2018 activity:** Proposal evaluation did not reveal any compelling opportunities beyond what is currently available in the current program. Continued focus on duct sealing. Program field staff engaged with and encouraged HVAC trade allies that offered promotional pricing for ductless heat pump installations in manufactured homes.

Residential Deep Energy Retrofit

- **Purpose:** Increase comprehensive projects (multiple energy using systems) in existing residential homes.
- **Costs:** Up to $20,000 for contractor engagement, project pre-qualification, pre/post modeling and high touch engagement during project including verification/close-out. Included in HES program delivery budgets for the biennial period.
- **Size:** One to four completed projects.
- **Implementation:** Establish a baseline model based on prior metered utility consumption and target improvements that will save 40-60 percent of total usage which translates into approximately 8,800 kWh delivered primarily from heating, cooling and water heating improvements. Add a customer incentive of up to $5,000 to the existing Home Energy Savings program.
- **Marketing:** Work with general contractor to identify existing homes where customers are prepared to make substantial improvements to the systems using or affecting the majority of the energy consumption in the home. The customer incentive is designed to offset a portion of the project costs which are estimated to be $15,000 to $30,000 depending on the size and site conditions of the home.
- **2018 report:** Two serious projects. Make-up air for combustion appliances, especially fireplaces/wood stoves remains challenging. The in process project required some make-up air ducting for an otherwise efficient wood stove that remains as supplemental heat source. The other project is on hold. This customer is acting as his own general contractor and continues to revise the project scope. With the scope in flux, pre-construction energy modeling or support for sub-contractors is not practical. While program support staff remains in contact with the customer, the project is on hold until the scope is refined and finalized.

Geo-Targeted Energy Efficiency

- **Purpose:** Focus on increasing participation in specific geographical area(s) where additional value, such as possible infrastructure investments has been identified. This is a continuation of work begun in 2017.
- **Costs:** Additional administrative costs of approximately $16,000 included in the program delivery budgets for the biennial period.
- **Size:** Approximately 5,800 customers.
- **Implementation:** The effort will focus on the Yakima area and installed projects will be tracked. A kWh to kilowatt (kW) calculator using existing load shapes is planned. This calculator would allow the Company's field engineering team to start looking for hourly capacity impacts of the installed energy efficiency projects.
- **Marketing:** Increase frequency of existing program tactics including direct mail, trade ally engagement and personal selling.
- **2018 activity**:
    - A kWh to kW calculator has been completed and was used to assess 2018 impacts.
    - The 2018 outreach efforts for business customers used utility, customer and third party data analysis to help focus outreach activities. Outreach included "boots on the ground", direct mail and email and an online form for small businesses to sign up for a no cost assessment.

- In 2018, twenty five business projects totaling 2,009,391 kWh in annual savings were completed in the geo-targeted areas with additional projects identified for potential installation in future years. 2018 projects are estimated to provide summer capacity reductions of 263 kW. Winter capacity reductions for these projects are estimated at 193 kW.

- Outreach also targeted residential customers with direct mail and program administrator field staff outreach to multi-family owners. In 2018, 219 projects totaling 129,158 kWh in annual savings were completed. 2018 projects are estimated to provide summer capacity reductions of 17 kW. Winter capacity reductions for these projects are estimated at 32 kW.

Non-Residential Lighting Controls

- **Purpose:** Increase installation of lighting controls as part of business customer lighting retrofit projects.
- **Costs:** Included in program delivery budgets
- **Size:** Up to 15 projects
- **Implementation:** Leverage the Northwest Energy Efficiency Alliance's Luminaire Level Lighting Control (LLLC) initiative including vendor training support. January 2018 program changes adjust incentive levels so that lighting combined with controls provides the highest incentive for lighting projects.
- **Marketing:** NXT Level training and good/better/best communications, continuing and improving lighting controls training for vendors, providing outreach coordinator feedback on lighting controls to approved wattsmart Business Vendors on projects.
- **2018 activity:**
  - **Contractor/Vendor Training:**
    - On March 13 and 14, 2018, Pacific Power hosted the annual vendor trainings in Walla Walla and Yakima. There was a hands-on lighting controls session focusing on the Eaton Wavelinx advanced network lighting control product. Vendors were able to interact with the product and use the app to program and commission the controls. Between the two locations, 57 vendors attended.
    - On June 7, 2018 the DLC hosted a hands-on Advanced Network Lighting Controls course in Kennewick. There were nine Pacific Power trade allies representing seven wattsmart Business Vendors in attendance.
    - Pacific Power committed to co-sponsor and promote a hands-on Advanced Network Lighting Control training to review different manufacturer products on June 5, 2019 in Kennewick. This effort will be in collaboration with NEEA's LLLC Initiative, the Seattle Lighting Design Lab and BPA.
  - **Contractor Incentive**: In 2018, Pacific Power developed a limited time $/fixture Contractor Incentive for Luminaire Level Lighting Control that will be promoted and offered in 2019. Contractors face up-front costs of time and money to obtain manufacturer certification(s) to install LLLC products. A contractor incentive (focused on the vendor's first projects only) along with the vendor support provided by the program could boost LLLC participation.
  - **Savings results:** Approximately 69 completed lighting projects with savings from controls totaling approximately 1.1 million kWh/year. There were no projects

including advanced networked lighting controls or Luminaire Level Lighting Controls.

Manufactured Homes

To support regional efforts in providing information about underserved markets or hard-to-reach segments, the Company has included information about its manufactured homes participation. The information provided below shows its historical manufactured home customers who have participated in the Company's *Low Income Weatherization* and *Home Energy Savings* programs.

Table 8
Participation by Manufactured Home Residents

	2014	2015	2016	2017	2018
Low Income Weatherization homes	40	44	49	45	41
Home Energy Savings participants	256	1,028	403	954	872
Appliances	34	10	10	4	8
Duct Sealing	197	187	12	795	492
Heat Pump	24	26	18	79	90
Heat Pump Water Heater	4	-	1	3	-
Kits	-	817	362	73	282
Lighting	12	17	1		
Lighting buy down	72,646	86,318	54,508	50,953	33,936
Weatherization	30	8	3	1	4

Two contractors were hired by the program administrator to conduct outreach and seal ducts at no cost to manufactured home residents. Home Energy Experts was selected or the Yakima area and Smith Insulation was selected for the Walla Walla area.

Over 1,700 mailers were sent to customers to generate interest and secure appointments, and 486 homes received the direct install offering (477 from Home Energy Experts and 9 from Smith Insulation). Residents in another 14 manufactured homes had their ducts sealed using a contractor they selected and paid.

Heat pump installations in manufactured homes in 2018 increased compared to the prior year. The number of contractors actively engaged in installations has increased to 15. The manufactured home installations include upgrades to more efficient equipment and converting electric furnaces to heat pumps.

Information on all participants except the lighting buy down was compiled by matching customer identifiers (concatenated service location and agreement numbers) of participants with the same information in residential customer accounts bearing the manufactured home dwelling code flag.

Information about the portion of lighting buy down participants who reside in manufactured homes follows the same calculation used in prior years and uses information from the general population survey from the latest evaluation.[22]

The Company also analyzed manufactured home customers who are also participants in the *Home Energy Reports* program. Table 9 below provides information on current 2018 behavioral program (*Home Energy Reports*) participation by manufactured home residents.

Table 9
Home Energy Reports Participation by Manufactured Home Residents

	Recipient	Control	Total
Legacy	1,668	1,607	3,275
Expansion	2,889	921	3,810
Refill	238	258	496

Information on the behavioral program participation was compiled in 2018 in the same manner (matching customer account number information) as described above for energy efficiency program participation.

In addition, the Advisory Group agreed that income data used to help categorize participants would also be useful for the regional efforts described above. Further, providing income information is not a program participation requirement and that available third party data would be used. Accordingly, this information is included in Table 10. The information in Table 10 uses zip code information for all *Home Energy Savings* program participants and those participants residing in manufactured homes as well as income information from the US Census Bureau. This comparison does not illustrate a strong correlation between lower income levels and manufactured home participation. Alternately stated, it appears program participation by manufactured home residents is similar to overall program participation by zip code/income level. Similar information was included in last year's report and 2018 was added for this report.

[22] In 2018, manufactured home customers purchased approximately fourteen percent of the units receiving incentives in the buy down channel. This is the same percentage as used in prior years. The methodology is included in this footnote. Lighting buy down information was compiled from survey information from the 2015-2016 Home Energy Savings evaluation. Customer prior year purchases for both CFLs and LEDs were added to arrive at a per-home purchase that was assumed to apply equally to all manufactured homes (approximately 15,300) and calculate an estimate of total purchases for manufactured homes. Manufactured home customers purchased approximately fourteen percent of the units receiving incentives in the buy down channel.

Table 10
Manufactured Home Income Data

ZIP Code	Median Household Income - US Census Bureau American Community Survey	Project Count - All DSM Projects 2014 - 2018	% Total DSM Projects	Project Count - MANUFACTURED Projects 2014 - 2018	% Total Manufactured Projects
98948	$41,169	281	1%	26	1%
98932	$44,783	275	1%	17	0%
98944	$46,366	1,118	5%	139	3%
98947	$46,997	228	1%	39	1%
98901	$47,816	1,773	8%	308	8%
98951	$48,503	527	2%	61	2%
98930	$48,523	897	4%	210	5%
98902	$49,023	3,143	14%	205	5%
98603	$51,552	2	0%	0	0%
98935	$51,768	133	1%	19	0%
98952	$52,747	34	0%	9	0%
98938	$53,951	81	0%	13	0%
99347	$55,066	223	1%	25	1%
99343	$55,279	0	0%	0	0%
98933	$56,091	43	0%	11	0%
99328	$59,055	450	2%	48	1%
98953	$59,580	470	2%	79	2%
98923	$60,717	82	0%	14	0%
99350	$61,829	6	0%	2	0%
98903	$61,831	1,551	7%	545	13%
99348	$62,510	161	1%	36	1%
98937	$62,580	496	2%	68	2%
99301	$63,663	0	0%	0	0%
98936	$66,016	448	2%	131	3%
98942	$67,363	1,450	6%	214	5%
99324	$69,535	1,005	4%	360	9%
99362	$70,035	3,896	17%	519	13%
99361	$72,569	255	1%	88	2%
98908	$73,702	3,267	14%	471	12%
99360	$77,753	119	1%	35	1%
99323	$80,315	441	2%	313	8%
98921	data not available	34	0%	9	0%
99329	data not available	20	0%	9	0%
98950	data not available	3	0%	0	0%
98939	data not available	11	0%	1	0%

ZIP Code	Median Household Income - US Census Bureau American Community Survey	Project Count - All DSM Projects 2014 - 2018	% Total DSM Projects	Project Count - MANUFACTURED Projects 2014 - 2018	% Total Manufactured Projects
99363	data not available	20	0%	16	0%
98920	data not available	1	0%	1	0%

Residential Programs

The residential energy efficiency portfolio is comprised of four programs: *Home Energy Savings*, *Home Energy Reports*, *Low Income Weatherization*, and *NEEA*. As shown in Table 11, the residential portfolio was cost effective based on four of the five standard cost effectiveness tests for the reporting period. The ratepayer impact test was less than 1.0 indicating that there is near term upward pressure placed on the price per kilowatt-hour given a reduction in sales.

Table 11
Cost Effectiveness for Residential Portfolio[23]

Benefit/Cost Test	B/C Ratio with NEEA	B/C Ratio without NEEA
PTRC	1.43	1.39
TRC	1.34	1.31
UCT	1.23	1.16
PCT	4.55	3.93
RIM	0.32	0.31

Individual program performance, program management and program infrastructure is provided on the following pages.

[23] Excludes *Low Income Weatherization* and includes select quantifiable and directly attributable non-energy benefits.

Home Energy Savings

The *Home Energy Savings* program provides access to and incentives for more efficient products and services installed or received by customers residing in newly constructed homes, existing homes, multi-family housing units or manufactured homes. The program was cost effective as shown in Table 12.

Table 12
Cost Effectiveness for Home Energy Savings[24]

Benefit/Cost Test	B/C Ratio
PTRC	1.34
TRC	1.27
UCT	1.07
PCT	3.26
RIM	0.31

Program participation by measure category is provided in Table 13.

Table 13
Eligible Program Measures (Units)

Measure Category	Total kWh/Yr Savings @ Site	Total Incentive	Total Quantity
Appliances	15,244	$5,400	108
Building Shell	52,629	$38,135	147,551 (sq ft)
Electronics	630	$130	3
Energy Kits	1,085,949	$33,570	2,905
HVAC	1,949,011	$716,104	1,037
Lighting	3,220,974	$280,299	242,401
Water Heating	54,358	$20,400	33
Whole Home	110,592	$57,672	33
Total	**6,489,387**	**$1,151,709**	

Program Management

The Company program manager who is responsible for the program in Washington is also responsible for the *Home Energy Savings* program in California and *Home Energy Reports* program in Washington. For each program and in each state the program manager is responsible for the cost effectiveness of the program, contracting with the program administrator monitoring program performance and compliance, and recommending changes in measures, incentives, or delivery requirements as set out in the tariff and/or posted on the Company's website.

[24] Includes quantifiable and directly attributable non-energy impacts.

Program Administration

The *Home Energy Savings* program is administered by CLEAResult. CLEAResult is responsible for the following:

- Retailer and trade ally engagement – CLEAResult identifies, recruits, supports, and assists retailers to increase the sale of energy efficient lighting, appliances and electronics. CLEAResult enters into promotion agreements with each lighting manufacturer and retailer for the promotion of discounted lighting equipment. The agreements include specific retail locations, lighting products receiving incentives and not-to-exceed annual budgets. Weatherization and HVAC trade allies engaged with the program are provided with program materials, training, and regular updates.

- Inspections – CLEAResult recruits and hires inspectors to verify on an on-going basis the installation of measures. A summary of the inspection process is in Appendix 2.

- Incentive processing and call-center operations – CLEAResult receives all requests for incentives, determines whether the applications are completed, works directly with customers when information is incorrect or missing from the application and processes the application for payment.

- Program specific customer communication and outreach – A summary of the communication and outreach is outlined in the Communication, Outreach and Education section.

In 2018, the Company issued a Request for Proposal to re-procure services for *Home Energy Savings* program in California and Washington. The Request for Proposal also included an outsourced portion of *watts*mart Business currently performed by Nexant and Cascade to allow for potential economies of a single contractor delivering for both programs. Selection and contracting will be complete in 2019.

Program Changes

Planned changes went into effect January 1, 2018 as part of the adaptive management strategy for aligning the Home Energy Savings program during the 2018-2019 biennium with updated planning assumptions, market conditions and pilot expectations. Namely:

- Updated unit energy savings and equipment eligibility to align with Regional Technical Forum (RTF) information available as of July 31, 2017.

- Added mid/upstream as an available delivery method for applicable appliance, HVAC, weatherization, and plumbing measures to enhance the Program's ability to align with other programs.

- Added options for who may receive an incentive. Provide added flexibility to allocate incentives to either the customer or a clearly specified market partner (e.g. dealer,

manufacturer, builder, rater and/or trade ally) and react to required implementation changes in a timely manner. Incentives may be split between the customer and a measure-specific market partner. The sum of the incentive payments per unit will clearly be displayed on the Program website with applicable dates. The customer portion of the incentive may be changed by the Company using the program change process.

- Added specific offerings for manufactured homes and multifamily properties with housing type-specific UES values. Specific offers improve marketing and savings reporting accuracy and will further improve targeted delivery in the manufactured home sector.

- Aligned new home offer with the most recent NEEA and Bonneville Power Administration offers for new construction and available savings beyond the latest version of the Washington State Energy Code. Focus the market on whole home design and performance and away from prescriptive measures, some of which are now required by code.

- Added deep energy retrofit offer to increase comprehensive residential weatherization project activity and scope of individual projects. Establish a baseline model based on prior metered utility consumption and target improvements of at least 40% of total usage.

- Added on-bill financing for incentive-eligible equipment or materials installed in existing homes. The offer utilizes Craft3, a third party vendor, for loan funding and servicing functions. Craft3 will work closely with the program administrator to inform trade allies and customers of the offer. Financing will be available for the net (after incentives deducted) costs of equipment eligible for incentives through the Program. Marketing and screening will be put in place to help ensure customers eligible for low income weatherization services are directed to the community action agencies instead of participating in this loan offer.

Adaptive Management

The Company made substantial changes through an adaptive management approach which included the following 2018 activities:

- In preparation for the manufactured homes duct sealing work, numerous efforts were made to engage with local contractors and recruit them to perform these services. The Program trained local trade ally, Smith Insulation, on participating in the manufactured homes direct install program in hopes to have more of a local presence with this offering in the Walla Walla area. Unfortunately, Smith was unable to complete the 50 units originally slated for them due to lower than expected demand in Walla Walla. Several local parks have had extensive work completed in past years both with our direct install effort as well as work completed through the low-income weatherization program administered by Blue Mountain Action Council. Smith Insulation also experienced a labor shortage along with a backlog of weatherization projects that resulted in an inability to complete as many units as they would have liked. The Program supported Smith Insulation with their efforts, leaving program fliers with the management office of parks in the Walla Walla area and sending out several batches of customer mailers. In total, Smith Insulation completed 8 units during the 2018 reporting year.

- The Program began implementing New Home Whole Home Performance Path application submittals through the NEEA's AXIS platform and the Program spent time this year improving relationships with both contractors and approved Raters.

- In an effort to continue promoting work in manufactured homes, the Program partnered with distributor, Thermal Supply, and Craft3 to develop a campaign promoting on-bill financing for Heat Pumps and Ductless Heat Pumps in manufactured homes for customers who own their own land.

Infrastructure

Multiple retailers and trade allies help deliver energy efficient products on behalf of the Company. The list of participating and non-participating retailers and trade allies by delivery channel and measure is provided in Appendix 3.

Evaluation

In 2018, ADM, the third party evaluator hired by the Company, began collecting data to support a process and impact evaluation for program years 2017-2018. The Company anticipates the report to be published by end of 2019.

Home Energy Reports

The *Home Energy Reports* program is a behavioral program designed to decrease participant energy usage by providing comparative energy usage data for similar homes located in the same geographical area. Additionally, the report provides the participant with information on how to decrease their energy usage. Equipped with this information, participants can modify behavior or make structural equipment, lighting, or appliance modifications to reduce their overall electric energy consumption.

Reports were initially provided to approximately 13,500 customers (referred to as "legacy" group). The number of participants decreased over time due to customer attrition from general customer churn (customer move-outs)[25] and customers requesting to be removed from the program. In 2014, the program was expanded to 38,500 additional customers (referred to as "expansion" group).[26] Another group of customers (referred to as "legacy refill" group) were added in January 2015 to offset attrition and lower energy savings than expected from the initial legacy group.[27]

Monthly reports are mailed to all new program participants for the initial three months to build program awareness. Following this initial three-month period, report frequency is moved to a bi-

[25] At the end of 2018 approximately 8,200 customers in the legacy group were still participating and receiving home energy reports.
[26] At the end of 2018, approximately 23,000 customers in the expansion group were still participating and receiving home energy reports.
[27] At the end of 2018, approximately 3,200 customers in the legacy refill group were still participating and receiving home energy reports.

monthly schedule for the remainder of the program. All participants may request an electronic version delivered via email and have access to a web portal containing the same information about their usage and past usage provided in the report. The web portal also contains other functions such as a home energy audit tool, the ability for customers to update their home profile (for more accurate comparisons) and suggestions on more ways to save energy around their home.

Results are shown in Table 14.

Table 14
Cost Effectiveness for *Home Energy Reports*

Benefit/Cost Test	Benefit/Cost Ratio	Benefit/Cost Ratio without Startup Fees
PTRC	1.90	3.45
TRC	1.73	3.13
UCT	1.73	3.13
PCT	N/A	N/A
RIM	0.28	0.30

Program savings by group is provided in Table 15.

Table 15
Program Savings

Home Energy Reports Group	Total kWh/Yr Savings @ Site
Expansion	4,626,270
Legacy + Refill	5,190,570
Grand Total	**9,816,840**

Consistent with planning assumptions used to establish the conservation target and business plan a two year measure life is used to assess costs effectiveness. The Home Energy Reports savings included in the table above are first year reported savings achieved. Any incremental savings for 2019 will be included in the 2018-2019 Biennial Conservation Report.

Program Management

The Company program manager overseeing program activity in Washington is also responsible for *the Home Energy Savings* program in California and Washington. For each program in each state, the program manager is responsible for the cost effectiveness of the program, contracting with the program administrator, monitoring program performance and compliance, and recommending changes measures, incentives or delivery requirements as set in the tariff or posted on the Company's website.

Program Administration

The *Home Energy Reports* program is administered by Bidgely who replaced the prior provider, OPower in early 2018. Bidgely's software creates individualized energy reports for utility customers that analyze their energy usage, disaggregates energy use into end uses and offers recommendations on how to save energy and money by making small changes to their energy consumption. Bidgely is using the same treatment and control groups used by OPower during the prior contract period. Similar to the prior contract, Bidgely's contract is turnkey and includes providing software services, report delivery (both email and print) to customers and reported energy savings.

During the transition between providers in 2018, there was a hiatus in delivering reports to customers as the OPower contract ended in the first quarter and Bidgely uploaded data into their model, tested the outputs and completed customization of their product (including end use disaggregation) for the Washington customers with delivery commencing in August. During the hiatus the Company continued to provide usage data for control and treatment groups to Bidgely who uploaded it into their model and estimated savings. Assessing customer savings when reports were not being sent provided the opportunity to test savings persistence (i.e, do customers continue to take actions to minimize energy consumption absent regular communications). Reported savings for 2018 are a combination of savings reported during the hiatus period and saving reported during the last portion of the year when customers were receiving reports.

Evaluation

A process and impact evaluation for program years 2016-2017 was published in May 2018. Notable findings include:

- For the Legacy wave, savings has begun to demonstrate some degradation of its control group. Expansion and Refill waves demonstrated a consistent improvement in energy savings.
- Refill respondents indicated higher satisfaction with the program than the Legacy or Expansion waves. Longer program tenure is correlated with an increased likelihood to indicate no longer wanting to receive reports.
- The program was cost effective from all perspectives except the RIM test.

The results of the evaluation can be viewed at www.pacificorp.com/es/dsm/washington.html.

Low Income Weatherization

The *Low Income Weatherization* program provides energy efficiency services through a partnership between the Company and local non-profit agencies to residential customers who meet income-eligible guidelines. Services are provided at no cost to the program participants. Cost effectiveness for the *Low Income Weatherization* program was not included in the portfolio or sector-level analysis per WAC 480-109-100 (10)(b).

In 2018, 108 homes were treated, saving 182,237 kWh (at site). Total homes treated, as well as the type and frequency of specific energy efficiency measures installed in each home, is provided in Table 16.

Table 16
Eligible Program Measures (Units)

Participation – Total # of Completed/Treated Homes	**108**
Number of Homes Receiving Specific Measures	
Aerators	57
Attic Ventilation	89
Caulk/Weather-stripping	81
Ceiling Insulation	71
Ductless Heat Pump	13
Duct Insulation	56
Floor Insulation	86
LED Light Fixtures	2
LED Light Bulbs	92
Ground Cover	55
Infiltration	96
Repairs	58
Replacement Refrigerators	9
Showerheads	52
Thermal Doors	6
Timed Thermostat	2
Wall Insulation	21
Water Heater Blankets	11
Water Heater Replacement	14
Water Pipe Insulation and Sealing	87
Windows	8

Program Management

The Company program manager overseeing program activity in Washington is also responsible for the *Low Income Weatherization* programs in California, Idaho, Utah, and Wyoming; the bill discount programs[28] ; and energy assistance programs[29] . For each program in each state, the program manager is responsible for the cost effectiveness of the energy efficiency programs, partnerships, and agreements in place with local agencies that serve income eligible households, establishing and monitoring program performance and compliance, and recommending changes in the terms and conditions set out in the tariff.

[28] The following Bill Discount programs provide reduced rate to income eligible households and program criteria varies by each state tariff: Low Income Bill Program (LIBA) in Washington; Home Energy Lifeline Program (HELP) in Utah; California Alternate Rates for Energy (CARE) in California.

[29] The federally funded Low Income Home Energy Assistance Program (LIHEAP) helps low income households with heating costs. Programs are administered by state agencies through designated local agencies in Washington, California, Idaho, Oregon, Utah and Wyoming. PacifiCorp offers a donation program and matches every dollar donated 2 to 1. Collected funds are sent to designated local agencies that provide energy assistance in Washington, California, Idaho, Oregon, Utah, and Wyoming.

Program Administration

The Company has long-term partnerships in place with three local non-profit agencies to provide weatherization services to income-qualifying households throughout its Washington service territory. These agencies include Blue Mountain Action Council located in Walla Walla, Northwest Community Action Center in Toppenish, and Opportunities Industrialization Center of Washington in Yakima. The Company entered into an agreement for these services with the Yakama Nation Housing Authority in July 2018. The leveraging of Company funding along with Washington Match Maker Program funds allows the agencies to provide these energy efficiency services to more households at no cost to participating customers. The Company provides rebates to partnering agencies for 50 percent of the cost of services while Match Maker funds are available, and will cover 100 percent of costs when these state funds are depleted. In 2018, 69 homes were funded at 50% and 39 at 100%. Match Maker funding was approved by the state legislature in mid-2017, but monies were not released until early 2018, resulting in the significant number of completions covered at the 100% level. Participants qualify if they are homeowners or renters residing in single-family homes, manufactured homes, or apartments. Over 7,700 homes have been completed with Pacific Power funding since the program's inception in the mid-1980s.

By contract with the Company, the agencies are responsible for the following:

- Income Verification – Agencies determine participant income eligibility based on Washington Department of Commerce guidelines. Households interested in obtaining weatherization services apply through the agencies. The income guidelines can be viewed on the Washington Department of Commerce website[30].
- Energy Audit – Agencies use a U.S. Department of Energy approved audit tool or priority list to determine the cost effective measures to install in the participant's homes (audit results must indicate a savings to investment ratio of 1.0 or greater).
- Installation of Measures – Agencies install the energy efficiency measures.
- Post Inspections – Agencies inspect 100 percent of completed homes. A sample of 5 -10 percent are inspected by a Pacific Power inspector. See Appendix 2 for verification summary.
- Billing Notification – Agencies are required to submit a billing to Company within 90 days after job completion. A homeowner agreement and invoice form indicating the measures installed and associated cost is submitted on each completed home.

Evaluation

A process and impact evaluation for program years 2013-2015 was published in January 2018. Notable findings include:

- An overall realization rate was 69 percent which was lower than the previous evaluation. Lower savings could be a result of a variety of factors including mix of measures installed.

[30] http://www.commerce.wa.gov/wp-content/uploads/2018/03/v.1.1-2018WALowIncomeEligibilityGuidelines.pdf

- The program was cost effective with an overall PTRC of 2.22.
- Average annual net energy savings per participant was estimated at 1,122 kWh.
- Participants continue to be highly satisfied with the Program.

The results of the evaluation can be viewed at www.pacificorp.com/es/dsm/washington.html.

Northwest Energy Efficiency Alliance

The Northwest Energy Efficiency Alliance (NEEA) is a non-profit corporation that works collaboratively with its funders and other strategic market partners to accelerate the innovation and adoption of energy-efficient products, services, and practices. NEEA is supported by BPA, Energy Trust of Oregon, and more than 100 Northwest utilities, including Pacific Power.

Program performance for 2018 is being reported based on NEEA's results for Pacific Power of 2,935 MWh (at site). Consistent with the reporting convention approved in Docket UE-132047 the savings represent Pacific Power's portion of Total Regional Savings less the Company's local program savings

Program Administration

The Company has a representative on the NEEA board of directors as well as representatives on each of the sector advisory committees, residential, commercial and industrial. The Company also has representation on NEEA's broader Regional Portfolio Advisory Committee and participates in relevant Northwest Research Group meetings. Collectively the representatives work collaboratively with the other funders, advisory group members, and NEEA to direct the efforts of NEEA in the best interest of the region in the achievement of the region's market transformation objectives.

Non-Residential Program

The Non-Residential Energy Efficiency program is promoted to the Company's commercial, industrial and agricultural customers as *watt*smart Business.

The *watt*smart Business program[31] is intended to maximize the efficient use of electricity for new and existing non-residential customers through the installation of energy efficiency measures and energy management protocols. Qualifying measures are any measures which, when implemented in an eligible facility, result in verifiable electric energy efficiency improvements.

The program was cost effective in 2018 as shown in Table 17 below.

Table 17
Cost Effectiveness for *watt*smart Business

Benefit/Cost Test	Benefit/Cost Ratio
PTRC	1.36
TRC	1.24
UCT	2.07
PCT	3.92
RIM	0.40

Sector level performance is provided in Table 18.

Table 18
Program Performance by Sector

Sector	Total kWh/Yr Savings @ Site	Total Incentive	Total kW Savings @ Site	Total Projects
Commercial	23,721,991	$2,483,198	2,295	373
Industrial	7,116,153	$701,657	652	52
Irrigation	388,369	$43,245	93	17
Total	**31,226,512**	**$3,228,100**	**3,039**	**442**

[31] The program brochure is available at https://www.pacificpower.net/content/dam/pacific_power/doc/Business/Save_Energy_Money/WA_wattsmartBusiness_Brochure.pdf . Program detail (in addition to the program tariff, Schedule 140) maintained on the Company website is available at https://www.pacificpower.net/content/dam/pacific_power/doc/Business/Save_Energy_Money/WA_wattsmartBusiness_Incentive_tables_information.pdf.

Program performance by measure category is provided in Table 19.

Table 19
Program Performance by Measure Category

Measure Category	Total kWh/Yr Savings @ Site	Total Incentive	Total kW Savings @ Site	Total Projects
Additional Measures	537,363	$53,271	34	3
Building Shell	40,611	$21,525	0	7
Compressed Air	1,353,235	$168,519	67	4
Energy Management	2,539,217	$50,784	139	8
Farm & Dairy	206,242	$20,765	10	4
HVAC	343,286	$33,301	20	8
Irrigation	417,195	$52,295	103	17
Lighting	16,520,907	$1,629,515	1,947	347
Motors	350,297	$42,279	54	9
Refrigeration	8,918,159	$1,155,847	664	35
Total	**31,226,512**	**$3,228,100**	**3,039**	**442**

Services and incentives offered through the *watt*smart Business program include:

- Typical Upgrades: Incentives for lighting, HVAC, irrigation and other equipment upgrades that increase electrical energy efficiency and exceed energy code requirements.
- Custom analysis: Offers energy analysis studies, services and incentives for more complex projects.
- Energy Management: Provides expert facility and process analysis and incentives to help lower energy costs by optimizing customer's energy use.
- Enhanced incentives for small businesses: Provides enhanced incentives for lighting upgrades installed by an approved *watt*smart Small Business Contractor at an eligible existing small business customer facility.
- Midstream/Lighting Instant Incentive: Provides instant, point-of-purchase incentive for qualifying LED lamps sold through participating distributors. Customers purchasing lamps from non-participating suppliers can apply for incentives after purchase.
- Energy Project Manager Co-funding: Available to customers who commit to an annual goal of completing energy projects resulting in at least 1,000,000 kWh/year in energy savings.
- Project Financing: Pacific Power is teamed with HBC Energy Capital[32], an energy efficiency project financing firm, to provide customers with access to third party financing options for instances where funds for project implementation are not available from within the customer's organization.

[32] HBC Energy Capital is a division of the National Energy Improvement Fund (NEIF)

Program Management

The Company program manager overseeing program activity in Washington is also responsible for the *watt*smart Business program in California. For each state the program manager is responsible for the cost effectiveness of the program, identifying, and contracting with the program administrators through a competitive bid process, program marketing, establishing and monitoring program performance and compliance, and recommending changes in the terms and conditions of the program set out in the tariff and/or posted on the Company's website.

Program Administration

The program includes several delivery channels, including Trade Ally, Small Business Enhanced Incentive Offer, Midstream/Lighting Instant Incentive, and Project Manager.

Trade Ally
In this channel, the program is primarily marketed through local trade allies who receive support from one of two program administrators. The Company contracts with Nexant, Inc. (Nexant) and Cascade Energy (Cascade) for trade ally coordination, training, application processing and project facilitation services for commercial measures and industrial/agricultural measures, respectively.

Nexant and Cascade are responsible for the following:

- Trade ally engagement – identify, recruit, train, support and assist trade allies to increase sales and installation of energy efficient equipment at qualifying business customer facilities.
- Incentive processing and administrative support – handle incoming inquiries as assigned, process incentive applications, develop and maintain simplified analysis tools and provide program design services, evaluation and regulatory support upon request.
- Direct customer outreach and project facilitation for smaller customer projects.
- Inspections – verify on an on-going basis the installation of measures.[33] A summary of the inspection process is in Appendix 2.

Small Business Enhanced Incentive Offer
In this channel, the program is primarily marketed through local contractors approved specifically for this offer who receive support from the program administrator, Nexant. Nexant is responsible for the following:

- Management of approved contractors – identify, recruit, contract with, train, support, and assist contractors to increase sales and installation of energy efficient lighting equipment at qualifying small business customer facilities.

[33] The Company contracts with firms from the energy engineering consultant list to perform required pre- and post-installation inspections for lighting retrofit and new construction/major renovation projects.

- Incentive processing and administrative support – handle incoming inquiries as assigned, process incentive applications, develop and maintain simplified analysis tool and provide program design services, evaluation and regulatory support upon request.
- Inspections – verify on an on-going basis the installation of measures. A summary of the inspection process is in Appendix 2 to this report.

Midstream/Instant Incentive Offer
In this channel, the program is primarily marketed through distributors approved specifically for this offer who receive support from the program administrator, Nexant. The program is also marketed through installation contractors, who also receive support from Nexant. Nexant is responsible for the following:

- Management of approved distributors – identify, recruit, contract with, train, support, and assist distributors to increase sales of energy efficient lighting equipment at qualifying business customer facilities.
- Incentive processing and administrative support – handle incoming inquiries as assigned, process incentive applications, and provide program design services, evaluation and regulatory support upon request.
- Inspections – verify on an on-going basis the installation of measures at eligible customer facilities. A summary of the inspection process is in Appendix 2 to this report.

Project Manager
In this channel, the Company's project manager manages a subset of more complex projects. The project manager works directly with the customer or through the Company's regional business managers.[34] The project manager provides customers with program services and incentives using a pre-contracted group of energy engineering consultants. A current list of these consultants is included in the Infrastructure section below.

Infrastructure

To help increase and improve the supplier and installation contractor infrastructure for typical energy efficient equipment and services, the Company established and continues to develop and support trade ally networks for lighting, HVAC and motors/VFDs. This work includes identifying and recruiting trade allies, providing program and technical training and providing sales support on an ongoing basis.

Participating vendors sign a wattsmart Business participation agreement and are listed as wattsmart Business Vendors in the Find a Vendor search on the Company's website. In addition to the formal wattsmart Business vendor networks, other trade allies such as irrigation vendors are identified and supported on an ongoing basis.

[34] Regional business managers are responsible for directly working with Washington commercial and industrial/ag customers.

The current searchable list of trade allies who have applied and been approved as participating *watt*smart Business vendors is available on the Company website[35] and included as Appendix 4 to this report. In most cases, customers are not required to select a vendor from these lists to receive an incentive.[36]

The total number of participating trade allies is currently 30. The current count of participating trade allies by technology are in Table 20.

Table 20
Participating Trade Allies[37]

Lighting	HVAC	Motors and VFD	Irrigation	Small Business – approved contractors	LED Instant Incentive – approved distributors, e-commerce retailers
24	4	13	1	3	6 distributors, 14 branch locations and 4 e-commerce retailers

For the project manager delivery channel supporting larger customers, a pre-approved, pre-contracted group of engineering firms can be used to perform facility specific energy efficiency analysis, quality assurance and verification. Table 21 lists the engineering firms currently under contract with the Company.

Table 21
Energy Engineering Firms

Engineering Firm	Main Office Location
Cascade Energy	Portland, OR
Compression Engineering Corp	Beaverton, OR
EMP2, Inc.	Richland, WA
Energy 350	Portland, OR
Energy Resources Integration, LLC	Sausalito, CA
4Sight Energy Group, LLC	Post Falls, ID
Evergreen Consulting Group	Portland, OR
kW Engineering, Inc.	Oakland, CA
Lincus Inc.	Emeryville, CA
Nexant, Inc.	Portland, OR
Solarc Energy Group	Eugene, OR

[35] Searchable participating vendor lists are available from the Company website. Direct link to the "Find a Vendor" search tool: http://pacificpower-tradeally.energyefficiencyalliance.net/tradeally/jspx/Contractor_Search/ContractorSearch.jspx

[36] For the *watt*smart Small Business enhanced incentives, customers are required to choose one of the approved contractors for this offer.

[37] Some trade allies may participate in more than one technology so the count of unique participating firms is less than the total count provided.

Program Changes

The Company made programmatic changes on two separate dates. Effective January 1, 2018, changes were made to:

- Improve program cost effectiveness in light of the new, lower avoided costs/decrement values from PacifiCorp's 2017 Integrated Resource Plan;
- Restructure lighting retrofit offerings for continuous improvement as the lighting market evolves;
- Adjust LED case lighting and other measures to align with current RTF analysis;
- Restructure Enhanced Incentives for Small Business customers;
- Add new measures and revise existing measures receiving instant incentives from qualifying distributors;
- Remove non cost effective measures and measures with low/no participation; and
- Make other minor administrative changes.

Effective July 1, 2018, changes were made to:

- Adjust capping requirements for the instant incentive offerings.
- Make other minor administrative changes.

Adaptive Management

The Company made substantial changes through an adaptive management approach. The following bullets summarize the changes.

- **Cost effectiveness improvement** - Due to the 2017 IRP's new lower decrement values, work continued in 2018 to identify ways to improve program cost effectiveness. Several improvements went into the Business Plan for 2018-2019 and were effective January 1, 2018:

    1. Added a maximum simple payback threshold at the project level to incentive eligibility requirements. Allow projects that exceed the threshold to be eligible for incentives if the project passes the Commission approved test (i.e. the TRC Test as modified by the Northwest Power and Conservation Council).
    2. Removed TLED, T8 and T5 Relamp measures and add Lamp Replacement category at the same incentive levels as the mid-market offer. This improves cost-effectiveness by moving most lamp replacement-only measures to mid-market, which has lower administrative costs.
    3. Removed some measures from the program that were not cost effective, had low participation, or both.

    An additional key improvement identified in 2018 was effective January 1, 2019: adopting the RTF non-residential lighting protocol's dual baseline savings and cost calculation methodology for lighting retrofits and small business lighting. Work on the revised lighting tool was substantially complete in 2018 and launched in January 2019.

- **New eLearning Platform** - In June 2018, the program introduced a new eLearning platform for wattsmart Business vendors. Currently available courses include:

  1. Intro to LED Dimming
  2. The Latest in Stand-Alone Lighting Controls: Wall Switch Sensors
  3. Facility Audits: Preparation and Toolkit
  4. Facility Audits: Fundamentals of Linear Fluorescent Lamps
  5. Facility Audits: T12, T8 and T5 Fluorescent Lamps
  6. Facility Audits: Retrofitting Linear Fluorescent Lamps

  The eLearning Platform will soon have two new wattsmart Business specific courses for Pacific Power and intends to use them as onboarding tools for the vendors. An advanced network lighting control course will also be launched soon. Program vendors can also take advantage of the courses to train their personnel.

  In Washington, there are 18 registered users on the platform with 12 course completions and 33 users with assigned courses or in process courses.

- **Advanced Rooftop Control (ARC) Unit Vendor Incentive** – In November 2018, the network offered an additional incentive[38] aimed at mechanical wattsmart Business vendors to promote and install the ARC measure at Pacific Power businesses. An eblast was sent out to the wattsmart Business Vendor network on November 20 and field staff promoted the incentive in their regular outreach. In December, two staff members at Young's Heating and Cooling in Walla Walla became certified by Transformative Wave to install the ARC measure. In 2018, they completed a total of four retrofit installs on existing roof top units at a business in Walla Walla. They received three $100 Amazon gift cards. This project is generating interest within the community and Young's continues to promote the ARC measure with other customers. Program field staff is working with another vendor, Campbell and Co., to promote the ARC measure and the vendor is working to find an interested customer.

- **Targeted Small Business Campaign** – Added provision to provide approved wattsmart Small Business Vendors who signed a Non-Disclosure agreement (in addition to the vendor participation agreement already on file) with refined customer lists (containing business name, address, phone number only) to more effectively connect with customers eligible for the small business enhanced incentives. Prior to providing the lists, postcards are mailed to each customer on the list to introduce them to the program and let them know a contractor will be contacting them. The intent of this initiative is to improve the efficiency of approved vendor's sales processes and boost small business participation. The first postcards were sent and lists were provided in December 2018 and resulted in several new project starts. This initiative also includes additional opportunities for cobranded marketing materials and Pacific Power wattsmart Business Vendor co-branded shirts that will be made available in 2019. The shirts help promote vendor credibility with small business customers.

[38] $100 Amazon gift card per ARC installed for first five units installed, limit of three gift cards per approved vendor

- **Premium Tier** – In early 2018, the first two trade allies qualified for the Premium status tier for the wattsmart Business lighting vendor network. Since January 2018, Stusser Electric in Yakima and Consolidated Electric Supply in Sunnyside have been recognized as Pacific Power's wattsmart Business Premium Vendors. Vendor performance is assessed on a quarterly basis in the Vendor Snapshot which also informs the trade ally if they qualified for Premium status. To be considered for Premium status, an approved *watt*smart Business Vendor has to complete a minimum number of projects in the past twelve months and hold a lighting credential such as the NEEA's NXT Level 1 Designation for both the company and an employee. Pacific Power established performance categories that align with program objectives to assess and rank lighting trade ally performance. In addition to project count and credentials, lighting vendors are also selected based on customer satisfaction, program satisfaction and project submission quality. The Premium Vendors come up first in the online Find-A-Vendor search results and their listing is highlighted in green so they stand out when someone searches for a lighting vendor. They are also given the opportunity to provide expanded information about their company in their online listing. The premium vendor list/flier as of winter 2018 is included in the appendix with the vendor lists.

- **Formal feedback** - A trade ally performance snapshot report called the Vendor Snapshot was introduced in 2017 to provide feedback on a quarterly basis to each approved lighting vendor performing work in the typical lighting program. Scorecards were provided to approved lighting vendors each quarter in 2018 and program coordinators followed up to review the snapshots with each vendor. The main purpose is to provide vendors with a summary of their performance, help them with continuous improvement and inform them of positive customer comments received from customer surveys. Program coordinators work with individual vendors to address any negative comments. The Vendor Snapshot includes total number of projects, savings, incentives, and the vendor's standing in comparison to other vendors.

- **Financing**[39]
  - Promoted the financing offer to wattsmart Business vendors
    i) Hosted two webinars for trade allies on the financing offer and how to integrate it into their sales process.
    ii) Articles in each 2018 quarterly Trade Ally newsletter promoted the finance offer and its benefits.
  - A new case study was created to showcase a Yakima small business customer who leveraged the financing offer for energy efficient lighting and air conditioner project (https://www.pacificpower.net/bus/se/tr/ccs/yakima-bindery-success-story.html).
  - In 2018, four Washington trade allies, including two small business contractors, leveraged the financing offer as a sales tool. Sixteen indicative financing offers were issued for eleven *watt*smart Business projects in 2018.

[39] https://www.pacificpower.net/bus/se/washington/project_financing.html

Evaluation

A process and impact evaluation for program years 2016-2017 was performed and published in November 2018. Notable findings include:

- Overall realization rate of 92.3 percent.
- The program was cost effective over the two-year period with a PTRC of 1.84.
- Majority of participants reported high levels of satisfaction.

The results of the evaluation can be viewed at www.pacificorp.com/es/dsm/washington.html.

Communications, Outreach and Education

The Company uses earned media, customer communications, paid media, and program specific media to communicate the value of energy efficiency, and provide information regarding low-cost and no-cost energy efficiency measures. The Company endeavors to educate customers on the availability of technical assistance, services, and incentives with the overall goal to engage customers in reducing their energy usage.

Earned Media

Earned media is managed by the Company's external communications department in cooperation with the regional business managers located in Washington. "Earned media" generally refers to favorable television, radio, newspaper, or internet news coverage gained through press releases, media events, opinion pieces, story pitches, or other communication with news editors and reporters.

Customer Communications

As part of the Company's regular communications to its customers, newsletters promote energy efficiency initiatives. Inserts and outer envelopes featuring energy efficiency messages have also been used on a consistent basis. The Company uses its website and social media, such as Twitter and Facebook, to communicate and engage customers on DSM offers and incentives.

Paid Media/wattsmart campaign

In 2018, the Company deployed a *watt*smart advertising campaign in English and Spanish to inform and educate residential customers about the benefits energy efficiency contributes to the greater good in addition to saving money. The overall paid media objective is to effectively reach our customers through a multi-faceted campaign with programs aimed at specific customer groups and the unifying theme "Being wattsmart saves me money, and it's good for Washington." This communication campaign aims to create awareness of the importance and benefits of being energy efficient, and to help increase participation in the Company's DSM programs.

Key strategies include:

- Implement an advertising campaign that features wattsmart energy efficiency messaging and connect it to benefits for Washington.
- Promote customer conservation (behavioral changes) and increase participation and savings through the Company's wattsmart DSM programs.
- Motivate customers in Washington to reduce consumption independently or to do so by participating in the Company's wattsmart DSM programs.
- Educate customers on how these programs can help them save money on their utility bills, reduce energy consumption and to help Washington thrive.

- Demonstrate by example how business customers are saving energy and enjoying the benefits of being wattsmart.

General Key Messages:

- Using energy wisely at home and in your business saves you money, and it's good for Washington.
- Surprising as it sounds, Pacific Power wants to help you use less energy.
- Pacific Power is your energy partner
  - We want to help you keep your costs down.
  - We offer wattsmart programs and cash incentives to help you save money and energy in your home or business.
  - Being wattsmart is good for your wallet, and for Washington, now and into the future.

To reach residential customers, the Company used TV, radio, social, and digital. Large-scale typography along with beautiful scenic images of Washington was combined with footage of people taking smalls steps (changing lighting to LED lamps, adjusting smart thermostat setting) to save energy and money and to make a big difference for Washington and the environment, now and into the future.

To reach business customers a multi-media mix of TV, radio, print, social and digital were used to reach as many customers as possible with the greatest frequency. Table 22 outlines the Washington media channels used, the value of each channel, and the impressions achieved.

Table 22
2018 Media Channels

Communication Channel	Value to Communication Portfolio	2018 Placements
Television	Television has the broadest reach and works as the most effective media channel	759,000 residential impressions 1,099,000business impressions
Radio	Given the cost relative to television, radio builds on communications delivered via television while providing for increased frequency of messages	400,000 residential impressions 530,000 business impressions
Newspaper/Magazine	Supports broadcast messages and guarantees coverage in areas harder to reach with broadcast	192,600 residential impressions 72,400 business impressions
Online advertising	Digital display and Google Search	985,098 residential impressions and 17,496 search impressions 1682,013 business impressions and 3,743 search impressions
Social Advertising	Advertising on Facebook, Hulu, YouTube and Pandora	1,025,254 residential impressions

Communication Channel	Value to Communication Portfolio	2018 Placements
		872,693 business impressions
Twitter @PacificPower_WA	Awareness for early adopters regarding energy efficiency tips Tweets posted on a weekly basis	980 followers through December 2018
Facebook www.facebook.com/pacificpower	Awareness for early adopters regarding energy efficiency tips and a location to share information	21,186 fans through December 2018 (for all Pacific Power states)

The total number of impressions for the campaign in 2018 was 7,643,297.

Links to the Company's current portfolio of advertisements are included in Appendix 5. The audiences for these messages were prioritized as follows:

- Primary - Small and large business in Pacific Power's service area.
- Secondary - Households in Pacific Power's service area.

Program Specific

All energy efficiency program communications are branded under the *watt*smart umbrella to reinforce the campaign and to link changes in behavior to actions customers can take by participating in specific programs. Separate marketing activities administered by and specific to the programs ran in conjunction with the *watt*smart campaign in 2018.

Home Energy Savings

Information on the *Home Energy Savings* program is communicated to customers, retailers and trade allies through a variety of channels including newsletters, emails, website and social media.

Promotional efforts in 2018 focused primarily on smart thermostats. With seasonally relevant messages, the program continued to build awareness about the benefits and the affordability (incentives, manufacturer discounts) of these sophisticated home devices.

A summary of outreach is displayed in Table 23.

Table 23
Home Energy Savings Communication Impressions

Communications Channel	2018
September smart thermostat emails	8,052
Black Friday smart thermostat emails	15,939
Holiday discounts/December smart thermostat emails	15,867
Total	**39,858**

Home Energy Reports

In 2018, the Company transitioned the Home Energy Reports from Oracle to Bidgely. To help with the transition, an email was sent to 13,246 customers in advance of receiving their first Bidgely report to let them know about the new Home Energy Reports.

With the Bidgely platform, customers receive two emails each month: (1) a monthly summary with an itemized lists of home energy costs by appliance, and (2) a similar homes comparison.

As a new feature, customers can easily use their Pacific Power login credentials to access their usage data, appliance breakdown and recommendations on the Bidgely platform.

*watt*smart Business

In 2018, customer communications and outreach supported *watt*smart Business using radio, print, paid digital display and search advertising, direct mail, email and social media. This was in addition to customer direct contact by Company project managers and regional community managers, as well as trade ally partners and content on the Company's website.

During 2018, the Company used radio and print advertising to encourage customers to inquire about incentives for lighting and lighting controls, Eblasts and digital search ads directed viewers to the Company's website[40]. Targeted direct mail was also sent to irrigation customers in the spring and fall to encourage energy-saving retrofits, Emails encouraged customers to reach out for free energy assessments for lighting. Repeated email communications focused on the benefits and incentives for HVAC assessments. Targeted direct mail was aimed at small business customers to generate interest in lighting upgrades and incentives.

One customer was recognized as *watt*smart Business Partners of the year, presented with a trophy, and announced in a press release. In 2018, the program garnered 1,672,875 impressions. A breakdown of impressions by media type is shown in Table 24.

Table 24
*watt*smart Business

Communications Channel	2018 Impressions
Radio	1,202,000
Newspaper	241,350
Magazine	137,900
Digital Display	77,661
Google Search	3,885
Eblasts	5,098
Irrigation Direct Mail	4,966
Small Business Direct Mail	15

[40] www.pacificpower.net/wasave

Energy Education in Schools

The Company offers a *watt*smart Schools education program through the National Energy Foundation (NEF). The program is designed to develop a culture of energy efficiency among teachers, students, and families. The centerpiece is a series of one hour presentations with educational and entertaining video components as well as hands-on, large group activities for 4th and 5th grade students. Teachers are provided instructional materials for use in their classrooms, and students are sent home with a Home Energy Worksheet to explore energy use in their homes and to encourage efficient behaviors.

In 2018, NEF conducted presentations in Washington schools in the fall. Between October 1 and the first week of November 2018, the program met its outreach goals of reaching 3,647 students and 150 teachers with 55 school presentations and 60 percent of "Home Energy Worksheets", which are used as part of a home energy audit activity, completed, and returned. The NEF 2018 Report can be found in Appendix 5.

Evaluations

Evaluations are performed by independent external evaluators to validate energy and demand savings derived from the Company's energy efficiency programs. Industry best practices are adopted by the Company with regards to principles of operation, methodologies, evaluation methods, definitions of terms, and protocols including those outlined in the National Action Plan for Energy Efficiency Program Impact Evaluation and the California Evaluation Framework guides.

A component of the overall evaluation effort is aimed at the reasonable verification of installations of energy efficient measures and associated documentation through review of documentation, surveys and/or ongoing onsite inspections.

Verification of the potential to achieve savings involves regular inspection and commissioning of equipment. The Company engages in programmatic verification activities, including inspections, quality assurance reviews, and tracking checks and balances as part of routine program implementation and may rely upon these practices in the verification of installation information for the purposes of savings verifications in advance of more formal impact evaluation results. A summary of the inspection process is included in Appendix 2.

Evaluation, measurement and verification tasks are segregated within the Company to ensure they are performed and managed by personnel who are not directly responsible for program management.

Information on evaluation activities completed or in progress during 2018 is summarized in the chart below. Summary of the recommendations are provided in Appendix 6. The evaluation reports are available at www.pacificorp.com/es/dsm/washington.html.

Program / Activities	Years Evaluated	Evaluator	Progress Status
Low Income Weatherization	2013-2015	Opinion Dynamics	Completed
Home Energy Reports	2016-2017	ADM	Completed
*watt*smart Business	2016-2017	Cadmus	Completed
Home Energy Savings	2017-2018	ADM	In progress

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Appendix 1
Cost Effectiveness

NAVIGANT

Memorandum

To: PacifiCorp

From: David Basak, Navigant

Date: April 25, 2019

Re: Cost-Effectiveness for the Portfolio and Sector Level - Washington

Navigant estimated the cost-effectiveness for the overall energy efficiency portfolio and component sectors, based on 2018 costs and savings estimates provided by PacifiCorp. This memo provides the cost-effectiveness results for the overall energy efficiency portfolio and the two sector components.

The program passes the cost-effectiveness for all the tests except the RIM test. The memo consists of the following tables.

Table 1 - Utility Inputs
Table 2 – Portfolio Level Costs
Table 3 – NEEA Inputs
Table 4 - Benefit/Cost Ratios by Portfolio Type
Table 5 – 2018 Total Portfolio Cost-Effectiveness Results
Table 6 – 2018 Total Portfolio Cost-Effectiveness Results (Including NEEA)
Table 7 – 2018 Total Portfolio Cost-Effectiveness Results (Including NEBs)
Table 8 – 2018 Total Portfolio Cost-Effectiveness Results (Including NEEA and NEBs)
Table 9 – 2018 C&I Energy Efficiency Portfolio Cost-Effectiveness Results
Table 10 – 2018 C&I Energy Efficiency Portfolio Cost-Effectiveness Results (Including NEEA)
Table 11 – 2018 Residential Energy Efficiency Portfolio Cost-Effectiveness Results
Table 12 – 2018 Residential Energy Efficiency Portfolio Cost-Effectiveness (Including NEEA)
Table 13 – 2018 Residential Energy Efficiency Portfolio Cost-Effectiveness (Including NEBs)
Table 14 – 2018 Residential Energy Efficiency Portfolio Cost-Effectiveness (Including NEEA and NEBs)
Table 15 – Home Energy Savings Non-Energy Benefits (2018)

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Table 1 - Utility Inputs

Parameter	Value
Discount Rate	6.57%
Residential Line Loss	9.67%
Commercial Line Loss	9.53%
Industrial Line Loss	8.16%
Irrigation Line Loss	9.67%
Residential Energy Rate ($/kWh)[1]	$0.0872
Commercial Energy Rate ($/kWh)[1]	$0.0857
Industrial Energy Rate ($/kWh)[1]	$0.0698
Irrigation Energy Rate ($/kWh)[1]	$0.0920
Inflation Rate	2.20%

[1] Future rates determined using a 2.20% annual escalator.

Table 2 – Portfolio Level Costs 2018

Expense	Cost
School Energy Education	$63,679
Outreach and Communication	$224,854
Portfolio Evaluation	$318,975
Portfolio Potential Study	$102,029
Portfolio System Support	$26,943
End Use Load Research	$35,082
Total Costs	**$771,563**

Table 3 – NEEA Inputs 2018

Sector	Savings at Meter (kWh)	NEEA Expenses ($)
Residential	1,664,400	$487,379
Industrial	1,226,400	$359,121
Commercial	44,349	$12,986
Total	**2,935,149**	**$859,487**

Table 4 - Benefit/Cost Ratios by Portfolio Type

Measure Group	PTRC	TRC	UCT	RIM	PCT
Total Portfolio	1.15	1.04	1.66	0.37	3.70
Total Portfolio (Including NEEA)	1.19	1.08	1.67	0.37	4.00
Total Portfolio (Including NEBs)	1.30	1.19	1.66	0.37	3.92
Total Portfolio (Including NEEA & NEBs)	1.33	1.22	1.67	0.37	4.22
C&I Programs	1.36	1.24	2.07	0.40	3.92
C&I Programs (Including NEEA)	1.39	1.26	2.06	0.40	4.11
Residential Programs	0.80	0.73	1.16	0.31	3.06
Residential Programs (Including NEEA)	0.91	0.83	1.23	0.32	3.69
Residential Programs (Including NEBs)	1.39	1.31	1.16	0.31	3.93
Residential Programs (Including NEEA & NEBs)	1.43	1.34	1.23	0.32	4.55

*Portfolio and Residential results exclude the Low Income Program from the analysis.

Table 5 – 2018 Total Portfolio Cost-Effectiveness Results

Cost-Effectiveness Test	Levelized $/kWh	Costs	Benefits	Net Benefits	Benefit/Cost Ratio
Total Resource Cost Test (PTRC) + Conservation Adder	$0.0409	$14,743,234	$16,894,015	$2,150,780	1.15
Total Resource Cost Test (TRC) No Adder	$0.0409	$14,743,234	$15,358,195	$614,961	1.04
Utility Cost Test (UCT)	$0.0256	$9,243,361	$15,358,195	$6,114,834	1.66
Rate Impact Test (RIM)		$41,402,967	$15,358,195	-$26,044,772	0.37
Participant Cost Test (PCT)		$9,879,682	$36,539,415	$26,659,733	3.70
Lifecycle Revenue Impacts ($/kWh)					$0.0000228886
Discounted Participant Payback (years)					1.41

Table 6 – 2018 Total Portfolio Cost-Effectiveness Results (Including NEEA)

Cost-Effectiveness Test	Levelized $/kWh	Costs	Benefits	Net Benefits	Benefit/Cost Ratio
Total Resource Cost Test (PTRC) + Conservation Adder	$0.0397	$15,602,721	$18,519,673	$2,916,952	1.19
Total Resource Cost Test (TRC) No Adder	$0.0397	$15,602,721	$16,836,066	$1,233,345	1.08
Utility Cost Test (UCT)	$0.0257	$10,102,848	$16,836,066	$6,733,218	1.67
Rate Impact Test (RIM)		$45,245,606	$16,836,066	-$28,409,540	0.37
Participant Cost Test (PCT)		$9,879,682	$39,522,567	$29,642,885	4.00
Lifecycle Revenue Impacts ($/kWh)					$0.0000220638
Discounted Participant Payback (years)					1.32

Table 7 – 2018 Total Portfolio Cost-Effectiveness Results (Including NEBs)

Cost-Effectiveness Test	Levelized $/kWh	Costs	Benefits	Net Benefits	Benefit/Cost Ratio
Total Resource Cost Test (PTRC) + Conservation Adder	$0.0409	$14,743,234	$19,110,706	$4,367,472	1.30
Total Resource Cost Test (TRC) No Adder	$0.0409	$14,743,234	$17,574,886	$2,831,652	1.19
Utility Cost Test (UCT)	$0.0256	$9,243,361	$15,358,195	$6,114,834	1.66
Rate Impact Test (RIM)		$41,402,967	$15,358,195	-$26,044,772	0.37
Participant Cost Test (PCT)		$9,879,682	$38,756,106	$28,876,424	3.92
Lifecycle Revenue Impacts ($/kWh)					$0.0000228886
Discounted Participant Payback (years)					1.41

Table 8 – 2018 Total Portfolio Cost-Effectiveness Results (Including NEEA and NEBs)

Cost-Effectiveness Test	Levelized $/kWh	Costs	Benefits	Net Benefits	Benefit/Cost Ratio
Total Resource Cost Test (PTRC) + Conservation Adder	$0.0397	$15,602,721	$20,736,364	$5,133,643	1.33
Total Resource Cost Test (TRC) No Adder	$0.0397	$15,602,721	$19,052,757	$3,450,036	1.22
Utility Cost Test (UCT)	$0.0257	$10,102,848	$16,836,066	$6,733,218	1.67
Rate Impact Test (RIM)		$45,245,606	$16,836,066	-$28,409,540	0.37
Participant Cost Test (PCT)		$9,879,682	$41,739,258	$31,859,576	4.22
Lifecycle Revenue Impacts ($/kWh)					$0.0000220638
Discounted Participant Payback (years)					1.32

Table 9 – 2018 C&I Energy Efficiency Portfolio Cost-Effectiveness Results

Cost-Effectiveness Test	Levelized $/kWh	Costs	Benefits	Net Benefits	Benefit/Cost Ratio
Total Resource Cost Test (PTRC) + Conservation Adder	$0.0352	$10,167,384	$13,835,031	$3,667,647	1.36
Total Resource Cost Test (TRC) No Adder	$0.0352	$10,167,384	$12,577,301	$2,409,917	1.24
Utility Cost Test (UCT)	$0.0211	$6,082,393	$12,577,301	$6,494,908	2.07
Rate Impact Test (RIM)		$31,536,043	$12,577,301	-$18,958,742	0.40
Participant Cost Test (PCT)		$7,313,091	$28,681,750	$21,368,659	3.92
Lifecycle Revenue Impacts ($/kWh)					$0.0000366109
Discounted Participant Payback (years)					1.68

Table 10 – 2018 C&I Energy Efficiency Portfolio Cost-Effectiveness Results (Including NEEA)

Cost-Effectiveness Test	Levelized $/kWh	Costs	Benefits	Net Benefits	Benefit/Cost Ratio
Total Resource Cost Test (PTRC) + Conservation Adder	$0.0347	$10,539,492	$14,617,274	$4,077,782	1.39
Total Resource Cost Test (TRC) No Adder	$0.0347	$10,539,492	$13,288,431	$2,748,939	1.26
Utility Cost Test (UCT)	$0.0213	$6,454,501	$13,288,431	$6,833,931	2.06
Rate Impact Test (RIM)		$33,286,856	$13,288,431	-$19,998,425	0.40
Participant Cost Test (PCT)		$7,313,091	$30,060,456	$22,747,364	4.11
Lifecycle Revenue Impacts ($/kWh)					$0.0000327345
Discounted Participant Payback (years)					1.60

Table 11 – 2018 Residential Energy Efficiency Portfolio Cost-Effectiveness Results

Cost-Effectiveness Test	Levelized $/kWh	Costs	Benefits	Net Benefits	Benefit/Cost Ratio
Total Resource Cost Test (PTRC) + Conservation Adder	$0.0530	$3,804,287	$3,058,984	-$745,304	0.80
Total Resource Cost Test (TRC) No Adder	$0.0530	$3,804,287	$2,780,894	-$1,023,393	0.73
Utility Cost Test (UCT)	$0.0333	$2,389,406	$2,780,894	$391,489	1.16
Rate Impact Test (RIM)		$9,095,362	$2,780,894	-$6,314,467	0.31
Participant Cost Test (PCT)		$2,566,591	$7,857,665	$5,291,075	3.06
Lifecycle Revenue Impacts ($/kWh)					$0.0000101838
Discounted Participant Payback (years)					0.96

Table 12 – 2018 Residential Energy Efficiency Portfolio Cost-Effectiveness (Including NEEA)

Cost-Effectiveness Test	Levelized $/kWh	Costs	Benefits	Net Benefits	Benefit/Cost Ratio
Total Resource Cost Test (PTRC) + Conservation Adder	$0.0482	$4,291,666	$3,902,399	-$389,268	0.91
Total Resource Cost Test (TRC) No Adder	$0.0482	$4,291,666	$3,547,635	-$744,031	0.83
Utility Cost Test (UCT)	$0.0323	$2,876,785	$3,547,635	$670,850	1.23
Rate Impact Test (RIM)		$11,187,187	$3,547,635	-$7,639,552	0.32
Participant Cost Test (PCT)		$2,566,591	$9,462,111	$6,895,521	3.69
Lifecycle Revenue Impacts ($/kWh)					$0.0000112898
Discounted Participant Payback (years)					0.87

Table 13 – 2018 Residential Energy Efficiency Portfolio Cost-Effectiveness (Including NEBs)

Cost-Effectiveness Test	Levelized $/kWh	Costs	Benefits	Net Benefits	Benefit/Cost Ratio
Total Resource Cost Test (PTRC) + Conservation Adder	$0.0530	$3,804,287	$5,275,675	$1,471,388	1.39
Total Resource Cost Test (TRC) No Adder	$0.0530	$3,804,287	$4,997,586	$1,193,298	1.31
Utility Cost Test (UCT)	$0.0333	$2,389,406	$2,780,894	$391,489	1.16
Rate Impact Test (RIM)		$9,095,362	$2,780,894	-$6,314,467	0.31
Participant Cost Test (PCT)		$2,566,591	$10,074,356	$7,507,766	3.93
Lifecycle Revenue Impacts ($/kWh)					$0.0000101838
Discounted Participant Payback (years)					0.96

Table 14 – 2018 Residential Energy Efficiency Portfolio Cost-Effectiveness (Including NEEA and NEBs)

Cost-Effectiveness Test	Levelized $/kWh	Costs	Benefits	Net Benefits	Benefit/Cost Ratio
Total Resource Cost Test (PTRC) + Conservation Adder	$0.0482	$4,291,666	$6,119,090	$1,827,423	1.43
Total Resource Cost Test (TRC) No Adder	$0.0482	$4,291,666	$5,764,326	$1,472,660	1.34
Utility Cost Test (UCT)	$0.0323	$2,876,785	$3,547,635	$670,850	1.23
Rate Impact Test (RIM)		$11,187,187	$3,547,635	-$7,639,552	0.32
Participant Cost Test (PCT)		$2,566,591	$11,678,802	$9,112,212	4.55
Lifecycle Revenue Impacts ($/kWh)					$0.0000112898
Discounted Participant Payback (years)					0.87

The table below summarizes the non-energy benefits for the Home Energy Savings program that were included in the results above.

Table 15 – Home Energy Savings Non-Energy Benefits (2018)

Non-Energy Benefits	Non-Energy Benefits Water ($/yr)	Non-Energy Benefits Other ($/yr)	Measure Life	Quantity	Total Present Value Benefits
Appliances	$2,805	$0	14	108	$26,834
Building Envelope	$0	$16,950	44	147,551	$258,680
Electronics	$0	$0	5	3	$0
Energy Kits - DHW	$127,150	$5,392	10	2,442	$981,526
Energy Kits - Lighting	$0	$993	10	463	$7,693
HVAC	$0	$10,123	16	1,037	$103,838
Lighting	$0	$149,633	7	242,401	$834,694
Water Heating	$0	$0	13	33	$0
Whole Home	$0	$242	32	33	$3,427
Total NEBs	**$129,956**	**$183,332**	**11**	**394,071**	**$2,216,691**

NAVIGANT

Memorandum

To: PacifiCorp

From: David Basak, Navigant

Date: April 25, 2019

Re: Cost-Effectiveness Results for the Home Energy Savings Program - Washington

Navigant estimated the cost-effectiveness results for the Washington Home Energy Savings Program, based on 2018 costs and savings estimates provided by PacifiCorp. This memo provides the cost-effectiveness results for the overall program and for the 8 measure categories.

Cost-effectiveness was tested using the 2017 IRP decrement for all measure categories. The program passes the cost-effectiveness for the UCT and PCT tests. The memo consists of the following tables.

Table 1 - Home Energy Savings Inputs
Table 2 – Home Energy Savings Annual Program Costs
Table 3 – Home Energy Savings – Savings by Measure Category
Table 4 - Benefit/Cost Ratios by Measure Category
Table 5 – Home Energy Savings Program Level (without NEBs) Cost-Effectiveness Results
Table 6 - Home Energy Savings Appliances Cost-Effectiveness Results
Table 7 - Home Energy Savings Building Shell Cost-Effectiveness Results
Table 8 - Home Energy Savings Electronics Cost-Effectiveness Results
Table 9 - Home Energy Savings Energy Kits – DHW Cost-Effectiveness Results
Table 10 - Home Energy Savings Energy Kits – Lighting Cost-Effectiveness Results
Table 11 - Home Energy Savings HVAC Cost-Effectiveness Results
Table 12 - Home Energy Savings Lighting Cost-Effectiveness Results
Table 13 - Home Energy Savings Water Heating Cost-Effectiveness Results
Table 14 - Home Energy Savings Whole Home Cost-Effectiveness Results
Table 15 - Home Energy Savings Non-Energy Benefits by Measure
Table 16 - Home Energy Savings Program (with NEBs) Cost-Effectiveness Results
Table 17 - Home Energy Savings Appliances (with NEBs) Cost-Effectiveness Results
Table 18 - Home Energy Savings Building Shell (with NEBs) Cost-Effectiveness Results
Table 19 - Home Energy Savings Energy Kit – DHW (with NEBs) Cost-Effectiveness Results
Table 20 - Home Energy Savings Energy Kit – Lighting (with NEBs) Cost-Effectiveness Results
Table 21 - Home Energy Savings HVAC (with NEBs) Cost-Effectiveness Results

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Table 22 - Home Energy Savings Lighting (with NEBs) Cost-Effectiveness Results
Table 23 - Home Energy Savings Whole Home (with NEBs) Cost-Effectiveness Results

Table 1 - Home Energy Savings Inputs

Parameter	Value
Discount Rate	6.57%
Residential Line Loss	9.67%
Residential Energy Rate ($/kWh)[1]	$0.0872
Inflation Rate	2.20%

[1] Future rates determined using a 2.20% annual escalator.

Table 2 – Home Energy Savings Annual Program Costs

Measure Category	Engineering Costs	Utility Admin	Program Delivery	Program Dev.	Incentives	Total Utility Costs	Gross Customer Costs
Appliances	$0	$94	$4,321	$214	$5,400	$10,029	$15,607
Building Shell	$0	$325	$14,919	$738	$38,135	$54,116	$163,733
Electronics	$0	$4	$179	$9	$130	$321	$101
Energy Kits - DHW	$0	$6,558	$55,025	$14,893	$30,884	$107,360	$30,884
Energy Kits - Lighting	$0	$146	$1,225	$331	$2,685	$4,387	$2,685
HVAC	$0	$12,031	$552,493	$27,323	$716,104	$1,307,952	$1,697,029
Lighting	$0	$19,883	$94,359	$47,959	$280,299	$442,500	$506,615
Water Heating	$0	$336	$15,409	$762	$20,400	$36,907	$29,674
Whole Home	$0	$683	$31,350	$1,550	$57,672	$91,255	$120,261
Total	**$0**	**$40,060**	**$769,280**	**$93,779**	**$1,151,709**	**$2,054,828**	**$2,566,591**

Table 3 – Home Energy Savings – Savings by Measure Category

Measure Category	Gross kWh Savings	Realization Rate	Adjusted Gross kWh Savings	Net to Gross Ratio	Net kWh Savings	Measure Life
Appliances	15,244	100%	15,244	100%	15,244	14
Building Shell	52,629	100%	52,629	100%	52,629	44
Electronics	630	100%	630	100%	630	5
Energy Kits - DHW	1,062,308	100%	1,062,308	100%	1,062,308	10
Energy Kits - Lighting	23,641	100%	23,641	100%	23,641	10
HVAC	1,949,011	100%	1,949,011	100%	1,949,011	16
Lighting	3,220,974	100%	3,220,974	100%	3,220,974	7
Water Heating	54,358	100%	54,358	100%	54,358	13
Whole Home	110,592	100%	110,592	100%	110,592	32
Total	**6,489,387**	**100%**	**6,489,387**	**100%**	**6,489,387**	**11**

Table 4 - Benefit/Cost Ratios by Measure Category

Measure Group	PTRC	TRC	UCT	RIM	PCT
Appliances	0.37	0.34	0.68	0.28	1.29
Appliances with NEBs	1.70	1.66	0.68	0.28	3.01
Building Shell	0.36	0.33	1.10	0.40	0.82
Building Shell with NEBs	1.80	1.77	1.10	0.40	2.40
Electronics	0.33	0.30	0.28	0.15	3.85
Energy Kits - DHW	3.16	2.88	2.88	0.34	26.57
Energy Kits - DHW with NEBs	12.31	12.02	2.88	0.34	58.35
Energy Kits - Lighting	1.71	1.56	1.56	0.31	7.55
Energy Kits - Lighting with NEBs	3.47	3.31	1.56	0.31	10.41
HVAC	0.50	0.46	0.80	0.31	1.64
HVAC with NEBs	0.55	0.50	0.80	0.31	1.70
Lighting	1.06	0.97	1.46	0.29	4.06
Lighting with NEBs	2.31	2.21	1.46	0.29	5.71
Water Heating	0.53	0.48	0.60	0.26	2.36
Whole Home	0.76	0.69	1.16	0.39	1.95
Whole Home with NEBs	0.78	0.71	1.16	0.39	1.98
Total with NEBs	**1.34**	**1.27**	**1.07**	**0.31**	**3.26**
Total	**0.70**	**0.63**	**1.07**	**0.31**	**2.39**

Table 5 – Home Energy Savings Program Level (without NEBs) Cost-Effectiveness Results

Cost-Effectiveness Test	Levelized $/kWh	Costs	Benefits	Net Benefits	Benefit/Cost Ratio
Total Resource Cost Test (PTRC) + Conservation Adder	$0.0650	$3,469,709	$2,422,965	-$1,046,744	0.70
Total Resource Cost Test (TRC) No Adder	$0.0650	$3,469,709	$2,202,695	-$1,267,014	0.63
Utility Cost Test (UCT)	$0.0385	$2,054,828	$2,202,695	$147,868	1.07
Rate Impact Test (RIM)		$7,046,936	$2,202,695	-$4,844,241	0.31
Participant Cost Test (PCT)		$2,566,591	$6,143,817	$3,577,227	2.39
Lifecycle Revenue Impacts ($/kWh)					$0.0000079159
Discounted Participant Payback (years)					2.53

Table 6 through Table 14 provides cost-effectiveness results without NEBs for all 9 measures.

Table 6 - Home Energy Savings Appliances Cost-Effectiveness Results (Load Shape – Residential_ERWH_7P)

Cost-Effectiveness Test	Levelized $/kWh	Costs	Benefits	Net Benefits	Benefit/Cost Ratio
Total Resource Cost Test (PTRC) + Conservation Adder	$0.1288	$20,236	$7,543	-$12,692	0.37
Total Resource Cost Test (TRC) No Adder	$0.1288	$20,236	$6,858	-$13,378	0.34
Utility Cost Test (UCT)	$0.0638	$10,029	$6,858	-$3,171	0.68
Rate Impact Test (RIM)		$24,724	$6,858	-$17,866	0.28
Participant Cost Test (PCT)		$15,607	$20,095	$4,488	1.29
Lifecycle Revenue Impacts ($/kWh)					$0.0000003155
Discounted Participant Payback (years)					8.81

Table 7 - Home Energy Savings Building Shell Cost-Effectiveness Results (Load Shape – WA_Single_Family_Heat_pump)

Cost-Effectiveness Test	Levelized $/kWh	Costs	Benefits	Net Benefits	Benefit/Cost Ratio
Total Resource Cost Test (PTRC) + Conservation Adder	$0.1760	$179,715	$65,412	-$114,302	0.36
Total Resource Cost Test (TRC) No Adder	$0.1760	$179,715	$59,466	-$120,249	0.33
Utility Cost Test (UCT)	$0.0530	$54,116	$59,466	$5,350	1.10
Rate Impact Test (RIM)		$150,371	$59,466	-$90,905	0.40
Participant Cost Test (PCT)		$163,733	$134,389	-$29,344	0.82
Lifecycle Revenue Impacts ($/kWh)					$0.0000005085
Discounted Participant Payback (years)					n/a

Table 8 - Home Energy Savings Electronics Cost-Effectiveness Results (Load Shape – WA_Single_Family_Plug)

Cost-Effectiveness Test	Levelized $/kWh	Costs	Benefits	Net Benefits	Benefit/Cost Ratio
Total Resource Cost Test (PTRC) + Conservation Adder	$0.1053	$292	$97	-$195	0.33
Total Resource Cost Test (TRC) No Adder	$0.1053	$292	$89	-$204	0.30
Utility Cost Test (UCT)	$0.1158	$321	$89	-$233	0.28
Rate Impact Test (RIM)		$580	$89	-$491	0.15
Participant Cost Test (PCT)		$101	$389	$288	3.85
Lifecycle Revenue Impacts ($/kWh)					$0.0000000243
Discounted Participant Payback (years)					n/a

Table 9 - Home Energy Savings Energy Kits – DHW Cost-Effectiveness Results (Load Shape – Residential_ERWH_7P)

Cost-Effectiveness Test	Levelized $/kWh	Costs	Benefits	Net Benefits	Benefit/Cost Ratio
Total Resource Cost Test (PTRC) + Conservation Adder	$0.0127	$107,360	$339,600	$232,240	3.16
Total Resource Cost Test (TRC) No Adder	$0.0127	$107,360	$308,727	$201,367	2.88
Utility Cost Test (UCT)	$0.0127	$107,360	$308,727	$201,367	2.88
Rate Impact Test (RIM)		$897,175	$308,727	-$588,448	0.34
Participant Cost Test (PCT)		$30,884	$820,700	$789,815	26.57
Lifecycle Revenue Impacts ($/kWh)					$0.0000145626
Discounted Participant Payback (years)					n/a

Table 10 - Home Energy Savings Energy Kits – Lighting Cost-Effectiveness Results (Load Shape – Residential_Lighting_7P)

Cost-Effectiveness Test	Levelized $/kWh	Costs	Benefits	Net Benefits	Benefit/Cost Ratio
Total Resource Cost Test (PTRC) + Conservation Adder	$0.0233	$4,387	$7,519	$3,131	1.71
Total Resource Cost Test (TRC) No Adder	$0.0233	$4,387	$6,835	$2,448	1.56
Utility Cost Test (UCT)	$0.0233	$4,387	$6,835	$2,448	1.56
Rate Impact Test (RIM)		$21,964	$6,835	-$15,129	0.31
Participant Cost Test (PCT)		$2,685	$20,262	$17,577	7.55
Lifecycle Revenue Impacts ($/kWh)					$0.0000003744
Discounted Participant Payback (years)					n/a

Table 11 - Home Energy Savings HVAC Cost-Effectiveness Results (Load Shape – WA_Single_Family_Heat_Pump)

Cost-Effectiveness Test	Levelized $/kWh	Costs	Benefits	Net Benefits	Benefit/Cost Ratio
Total Resource Cost Test (PTRC) + Conservation Adder	$0.1036	$2,288,877	$1,151,737	-$1,137,140	0.50
Total Resource Cost Test (TRC) No Adder	$0.1036	$2,288,877	$1,047,034	-$1,241,844	0.46
Utility Cost Test (UCT)	$0.0592	$1,307,952	$1,047,034	-$260,919	0.80
Rate Impact Test (RIM)		$3,376,095	$1,047,034	-$2,329,061	0.31
Participant Cost Test (PCT)		$1,697,029	$2,784,246	$1,087,217	1.64
Lifecycle Revenue Impacts ($/kWh)					$0.0000359561
Discounted Participant Payback (years)					6.30

Table 12 - Home Energy Savings Lighting Cost-Effectiveness Results (Load Shape – Residential_Lighting_7P)

Cost-Effectiveness Test	Levelized $/kWh	Costs	Benefits	Net Benefits	Benefit/Cost Ratio
Total Resource Cost Test (PTRC) + Conservation Adder	$0.0351	$668,817	$710,241	$41,424	1.06
Total Resource Cost Test (TRC) No Adder	$0.0351	$668,817	$645,673	-$23,144	0.97
Utility Cost Test (UCT)	$0.0232	$442,500	$645,673	$203,173	1.46
Rate Impact Test (RIM)		$2,220,870	$645,673	-$1,575,197	0.29
Participant Cost Test (PCT)		$506,615	$2,058,669	$1,552,053	4.06
Lifecycle Revenue Impacts ($/kWh)					$0.0000556895
Discounted Participant Payback (years)					0.79

Table 13 - Home Energy Savings Water Heating Cost-Effectiveness Results (Load Shape – Residential_HPWH_7P)

Cost-Effectiveness Test	Levelized $/kWh	Costs	Benefits	Net Benefits	Benefit/Cost Ratio
Total Resource Cost Test (PTRC) + Conservation Adder	$0.0870	$46,181	$24,424	-$21,756	0.53
Total Resource Cost Test (TRC) No Adder	$0.0870	$46,181	$22,204	-$23,977	0.48
Utility Cost Test (UCT)	$0.0696	$36,907	$22,204	-$14,703	0.60
Rate Impact Test (RIM)		$86,496	$22,204	-$64,292	0.26
Participant Cost Test (PCT)		$29,674	$69,989	$40,315	2.36
Lifecycle Revenue Impacts ($/kWh)					$0.0000012229
Discounted Participant Payback (years)					1.95

Table 14 - Home Energy Savings Whole Home Cost-Effectiveness Results (Load Shape – WA_Single_Family_Heat_pump)

Cost-Effectiveness Test	Levelized $/kWh	Costs	Benefits	Net Benefits	Benefit/Cost Ratio
Total Resource Cost Test (PTRC) + Conservation Adder	$0.0815	$153,844	$116,391	-$37,453	0.76
Total Resource Cost Test (TRC) No Adder	$0.0815	$153,844	$105,810	-$48,034	0.69
Utility Cost Test (UCT)	$0.0484	$91,255	$105,810	$14,555	1.16
Rate Impact Test (RIM)		$268,662	$105,810	-$162,851	0.39
Participant Cost Test (PCT)		$120,261	$235,079	$114,817	1.95
Lifecycle Revenue Impacts ($/kWh)					$0.0000012535
Discounted Participant Payback (years)					n/a

In addition to the energy benefits reported above, appliances, building envelope, energy savings kits, HVAC, lighting, and whole home in the Home Energy Savings program offer significant non-energy benefits (NEBs). Table 15 through Table 23 detail the non-energy benefits and cost-effectiveness results.

Table 15 - Home Energy Savings Non-Energy Benefits by Measure

Measure Category	Non-Energy Benefits Water ($/yr)	Non-Energy Benefits Other ($/yr)	Quantity	Measure Life	Total NEBs ($/yr)	Discount Rate	Total Net Present Value Benefits
Appliances	$2,805	$0	108	14	$2,805	6.57%	$26,834
Building Envelope	$0	$16,950	147,551	44	$16,950	6.57%	$258,680
Electronics	$0	$0	3	5	$0	6.57%	$0
Energy Kits - DHW	$127,150	$5,392	2,442	10	$132,542	6.57%	$981,526
Energy Kits - Lighting	$0	$993	463	10	$993	6.57%	$7,693
HVAC	$0	$10,123	1,037	16	$10,123	6.57%	$103,838
Lighting	$0	$149,633	242,401	7	$149,633	6.57%	$834,694
Water Heating	$0	$0	33	13	$0	6.57%	$0
Whole Home	$0	$242	33	32	$242	6.57%	$3,427
Total NEBs	**$129,956**	**$183,332**	**394,071**	**11**	**$313,288**	**6.57%**	**$2,216,691**

The following table provides the cost-effectiveness results after adding in the non-energy benefits detailed above beginning with the overall program results.

Table 16 - Home Energy Savings Program (with NEBs) Cost-Effectiveness Results

Cost-Effectiveness Test	Levelized $/kWh	Costs	Benefits	Net Benefits	Benefit/Cost Ratio
Total Resource Cost Test (PTRC) + Conservation Adder	$0.0650	$3,469,709	$4,639,656	$1,169,947	1.34
Total Resource Cost Test (TRC) No Adder	$0.0650	$3,469,709	$4,419,387	$949,677	1.27
Utility Cost Test (UCT)	$0.0385	$2,054,828	$2,202,695	$147,868	1.07
Rate Impact Test (RIM)		$7,046,936	$2,202,695	-$4,844,241	0.31
Participant Cost Test (PCT)		$2,566,591	$8,360,509	$5,793,918	3.26
Lifecycle Revenue Impacts ($/kWh)					$0.0000079159
Discounted Participant Payback (years)					2.53

The following tables provide the cost-effectiveness results after adding in the non-energy benefits for the measure categories receiving NEBs.

Table 17 - Home Energy Savings Appliances (with NEBs) Cost-Effectiveness Results (Load Shape – Residential_ERWH_7P)

Cost-Effectiveness Test	Levelized $/kWh	Costs	Benefits	Net Benefits	Benefit/Cost Ratio
Total Resource Cost Test (PTRC) + Conservation Adder	$0.1288	$20,236	$34,378	$14,142	1.70
Total Resource Cost Test (TRC) No Adder	$0.1288	$20,236	$33,692	$13,456	1.66
Utility Cost Test (UCT)	$0.0638	$10,029	$6,858	-$3,171	0.68
Rate Impact Test (RIM)		$24,724	$6,858	-$17,866	0.28
Participant Cost Test (PCT)		$15,607	$46,929	$31,323	3.01
Lifecycle Revenue Impacts ($/kWh)					$0.0000003155
Discounted Participant Payback (years)					8.81

Table 18 - Home Energy Savings Building Shell (with NEBs) Cost-Effectiveness Results (Load Shape – WA_Single_Family_Heat_pump)

Cost-Effectiveness Test	Levelized $/kWh	Costs	Benefits	Net Benefits	Benefit/Cost Ratio
Total Resource Cost Test (PTRC) + Conservation Adder	$0.1760	$179,715	$324,092	$144,378	1.80
Total Resource Cost Test (TRC) No Adder	$0.1760	$179,715	$318,146	$138,431	1.77
Utility Cost Test (UCT)	$0.0530	$54,116	$59,466	$5,350	1.10
Rate Impact Test (RIM)		$150,371	$59,466	-$90,905	0.40
Participant Cost Test (PCT)		$163,733	$393,069	$229,336	2.40
Lifecycle Revenue Impacts ($/kWh)					$0.0000005085
Discounted Participant Payback (years)					n/a

Table 19 - Home Energy Savings Energy Kit – DHW (with NEBs) Cost-Effectiveness Results (Load Shape – Residential_ERWH_7P)

Cost-Effectiveness Test	Levelized $/kWh	Costs	Benefits	Net Benefits	Benefit/Cost Ratio
Total Resource Cost Test (PTRC) + Conservation Adder	$0.0127	$107,360	$1,321,126	$1,213,766	12.31
Total Resource Cost Test (TRC) No Adder	$0.0127	$107,360	$1,290,253	$1,182,893	12.02
Utility Cost Test (UCT)	$0.0127	$107,360	$308,727	$201,367	2.88
Rate Impact Test (RIM)		$897,175	$308,727	-$588,448	0.34
Participant Cost Test (PCT)		$30,884	$1,802,226	$1,771,341	58.35
Lifecycle Revenue Impacts ($/kWh)					$0.0000145626
Discounted Participant Payback (years)					n/a

Table 20 - Home Energy Savings Energy Kit – Lighting (with NEBs) Cost-Effectiveness Results (Load Shape – Residential_Lighting_7P)

Cost-Effectiveness Test	Levelized $/kWh	Costs	Benefits	Net Benefits	Benefit/Cost Ratio
Total Resource Cost Test (PTRC) + Conservation Adder	$0.0233	$4,387	$15,211	$10,824	3.47
Total Resource Cost Test (TRC) No Adder	$0.0233	$4,387	$14,528	$10,140	3.31
Utility Cost Test (UCT)	$0.0233	$4,387	$6,835	$2,448	1.56
Rate Impact Test (RIM)		$21,964	$6,835	-$15,129	0.31
Participant Cost Test (PCT)		$2,685	$27,955	$25,270	10.41
Lifecycle Revenue Impacts ($/kWh)					$0.0000003744
Discounted Participant Payback (years)					n/a

Table 21 - Home Energy Savings HVAC (with NEBs) Cost-Effectiveness Results (Load Shape – WA_Single_Family_Heat_Pump)

Cost-Effectiveness Test	Levelized $/kWh	Costs	Benefits	Net Benefits	Benefit/Cost Ratio
Total Resource Cost Test (PTRC) + Conservation Adder	$0.1036	$2,288,877	$1,255,575	-$1,033,303	0.55
Total Resource Cost Test (TRC) No Adder	$0.1036	$2,288,877	$1,150,871	-$1,138,006	0.50
Utility Cost Test (UCT)	$0.0592	$1,307,952	$1,047,034	-$260,919	0.80
Rate Impact Test (RIM)		$3,376,095	$1,047,034	-$2,329,061	0.31
Participant Cost Test (PCT)		$1,697,029	$2,888,084	$1,191,055	1.70
Lifecycle Revenue Impacts ($/kWh)					$0.0000359561
Discounted Participant Payback (years)					6.30

Table 22 - Home Energy Savings Lighting (with NEBs) Cost-Effectiveness Results (Load Shape – Residential_Lighting_7P)

Cost-Effectiveness Test	Levelized $/kWh	Costs	Benefits	Net Benefits	Benefit/Cost Ratio
Total Resource Cost Test (PTRC) + Conservation Adder	$0.0351	$668,817	$1,544,934	$876,117	2.31
Total Resource Cost Test (TRC) No Adder	$0.0351	$668,817	$1,480,367	$811,550	2.21
Utility Cost Test (UCT)	$0.0232	$442,500	$645,673	$203,173	1.46
Rate Impact Test (RIM)		$2,220,870	$645,673	-$1,575,197	0.29
Participant Cost Test (PCT)		$506,615	$2,893,362	$2,386,747	5.71
Lifecycle Revenue Impacts ($/kWh)					$0.0000556895
Discounted Participant Payback (years)					0.79

Table 23 - Home Energy Savings Whole Home (with NEBs) Cost-Effectiveness Results (Load Shape – WA_Single_Family_Heat_pump)

Cost-Effectiveness Test	Levelized $/kWh	Costs	Benefits	Net Benefits	Benefit/Cost Ratio
Total Resource Cost Test (PTRC) + Conservation Adder	$0.0815	$153,844	$119,818	-$34,026	0.78
Total Resource Cost Test (TRC) No Adder	$0.0815	$153,844	$109,237	-$44,607	0.71
Utility Cost Test (UCT)	$0.0484	$91,255	$105,810	$14,555	1.16
Rate Impact Test (RIM)		$268,662	$105,810	-$162,851	0.39
Participant Cost Test (PCT)		$120,261	$238,505	$118,244	1.98
Lifecycle Revenue Impacts ($/kWh)					$0.0000012535
Discounted Participant Payback (years)					n/a

NAVIGANT

Memorandum

To: PacifiCorp

From: David Basak, Navigant

Date: April 25, 2019

Re: Cost-Effectiveness Results for the Home Energy Reporting Program - Washington

Navigant estimated the cost-effectiveness results for the Washington Home Energy Reporting Program, based on 2018 costs and savings estimates provided by PacifiCorp. This memo provides the cost-effectiveness results for the overall program.

Cost-effectiveness was tested using the 2017 IRP decrement. The program passes the cost-effectiveness for all the tests except the RIM and PCT tests.

Table 1 - Home Energy Reporting Inputs
Table 2 – Home Energy Reporting Annual Program Costs
Table 3 – Home Energy Reporting Savings
Table 4 - HER Program Level Cost-Effectiveness Results

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Table 1 - Home Energy Reporting Inputs

Parameter	Value
Discount Rate	6.57%
Residential Line Loss	9.67%
Residential Energy Rate ($/kWh)[1]	$0.0872
Inflation Rate	2.20%

[1] Future rates determined using a 2.20% annual escalator.

Table 2 – Home Energy Reporting Annual Program Costs

Measure Category	Engineering Costs	Utility Admin	Program Delivery	Program Dev.	Incentives	Total Utility Costs	Gross Customer Costs
HER Program	$0	$11,106	$279,922	$43,550	$0	$334,578	$0

Table 3 – Home Energy Reporting Savings

Measure Category	Gross kWh Savings	Realization Rate	Adjusted Gross kWh Savings	Net to Gross Ratio	Net kWh Savings	Measure Life
HER Program	9,816,840	100%	9,816,840	100%	9,816,840	2

Table 4 - HER Program Level Cost-Effectiveness Results
(Load Shape – WA_Single_Family_Heat_Pump)

Cost-Effectiveness Test	Levelized $/kWh	Costs	Benefits	Net Benefits	Benefit/Cost Ratio
Total Resource Cost Test (PTRC) + Conservation Adder	$0.0182	$334,578	$636,019	$301,441	1.90
Total Resource Cost Test (TRC) No Adder	$0.0182	$334,578	$578,199	$243,621	1.73
Utility Cost Test (UCT)	$0.0182	$334,578	$578,199	$243,621	1.73
Rate Impact Test (RIM)		$2,048,426	$578,199	-$1,470,227	0.28
Participant Cost Test (PCT)		$0	$1,713,848	$1,713,848	n/a
Lifecycle Revenue Impacts ($/kWh)					$0.0001819427
Discounted Participant Payback (years)					n/a

NAVIGANT

Memorandum

To: PacifiCorp

From: David Basak, Navigant

Date: April 25, 2019

Re: Cost-Effectiveness Results for the Home Energy Reporting Program - Washington

Navigant estimated the cost-effectiveness results for the Washington Home Energy Reporting Program, based on 2018 costs and savings estimates provided by PacifiCorp. This memo provides the cost-effectiveness results for the overall program.

Cost-effectiveness was tested using the 2017 IRP decrement. The program passes the cost-effectiveness for all the tests except the RIM and PCT tests.

Table 1 - Home Energy Reporting Inputs
Table 2 – Home Energy Reporting Annual Program Costs
Table 3 – Home Energy Reporting Savings by Measure Category
Table 4 - Benefit/Cost Ratios by Measure Category
Table 5 - HER Program Level Cost-Effectiveness Results
Table 6 – HER Program Level Cost-Effectiveness Results

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Table 1 - Home Energy Reporting Inputs

Parameter	Value
Discount Rate	6.57%
Residential Line Loss	9.67%
Residential Energy Rate ($/kWh)[1]	$0.0872
Inflation Rate	2.20%

[1] Future rates determined using a 2.20% annual escalator.

Table 2 – Home Energy Reporting Annual Program Costs

Measure Category	Engineering Costs	Utility Admin	Program Delivery	Program Dev.	Incentives	Total Utility Costs	Gross Customer Costs
Total	$0	$11,106	$279,922	$43,550	$0	$334,578	$0
Total w/o startup fees	$0	$11,106	$129,922	$43,550	$0	$184,578	$0

Table 3 – Home Energy Reporting Savings by Measure Category

Measure Category	Gross kWh Savings	Realization Rate	Adjusted Gross kWh Savings	Net to Gross Ratio	Net kWh Savings	Measure Life
Total	9,816,840	100%	9,816,840	100%	9,816,840	2
Total w/o startup fees	9,816,840	100%	9,816,840	100%	9,816,840	2

Table 4 - Benefit/Cost Ratios by Measure Category

Measure Category	PTRC	TRC	UCT	RIM	PCT
Total	1.90	1.73	1.73	0.28	n/a
Total w/o startup fees	3.45	3.13	3.13	0.30	n/a

Table 5 - HER Program Level Cost-Effectiveness Results
(Load Shape – WA_Single_Family_Heat_Pump)

Cost-Effectiveness Test	Levelized $/kWh	Costs	Benefits	Net Benefits	Benefit/Cost Ratio
Total Resource Cost Test (PTRC) + Conservation Adder	$0.0182	$334,578	$636,019	$301,441	1.90
Total Resource Cost Test (TRC) No Adder	$0.0182	$334,578	$578,199	$243,621	1.73
Utility Cost Test (UCT)	$0.0182	$334,578	$578,199	$243,621	1.73
Rate Impact Test (RIM)		$2,048,426	$578,199	-$1,470,227	0.28
Participant Cost Test (PCT)		$0	$1,713,848	$1,713,848	n/a
Lifecycle Revenue Impacts ($/kWh)					$0.0001819427
Discounted Participant Payback (years)					n/a

Table 6 provides the cost-effectiveness results for the Home Energy Reporting program with startup fees removed.

Table 6 – HER Program Level Cost-Effectiveness Results – Without Startup Fees (Load Shape – WA_Single_Family_Heat_Pump)

Cost-Effectiveness Test	Levelized $/kWh	Costs	Benefits	Net Benefits	Benefit/Cost Ratio
Total Resource Cost Test (PTRC) + Conservation Adder	$0.0100	$184,578	$636,019	$451,441	3.45
Total Resource Cost Test (TRC) No Adder	$0.0100	$184,578	$578,199	$393,621	3.13
Utility Cost Test (UCT)	$0.0100	$184,578	$578,199	$393,621	3.13
Rate Impact Test (RIM)		$1,898,426	$578,199	-$1,320,227	0.30
Participant Cost Test (PCT)		$0	$1,713,848	$1,713,848	n/a
Lifecycle Revenue Impacts ($/kWh)					$0.0001633800
Discounted Participant Payback (years)					n/a

NAVIGANT

Memorandum

To: Esther Giezendanner and Brian Ludwig, PacifiCorp

From: David Basak, Navigant

Date: April 29, 2019

Re: Cost-Effectiveness Results for the Low Income Weatherization Program - Washington

Navigant estimated the cost-effectiveness results for the Washington Low Income Weatherization Program, based on 2018 costs and savings estimates provided by PacifiCorp. This memo provides the cost-effectiveness results for the overall program.

Cost-effectiveness was tested using the 2017 IRP decrement. The program does not pass any of the cost-effectiveness tests.

Table 1 - Low Income Weatherization Inputs
Table 2 - Low Income Weatherization Annual Program Costs
Table 3 - Low Income Weatherization Savings by Measure Category
Table 4 - Low Income Weatherization Program Level Cost-Effectiveness Results
Table 5 - Low Income Weatherization Non-Energy Benefits
Table 6 - Low Income Weatherization Program (with NEBs) Level Cost-Effectiveness Results

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Table 1 - Low Income Weatherization Inputs

Parameter	Value
Discount Rate	6.57%
Residential Line Loss	9.67%
Residential Energy Rate ($/kWh)[1]	$0.0872
Inflation Rate	2.20%

[1] Future rates determined using a 2.20% annual escalator.

Table 2 - Low Income Weatherization Annual Program Costs

Measure Category	Engineering Costs	Utility Admin	Program Delivery	Program Dev.	Inspection Costs	Incentives	Total Utility Costs	Gross Customer Costs
Low Income Weatherization	$0	$19,902	$113,152	$3,212	$3,843	$789,214	$929,323	$0
Total	**$0**	**$19,902**	**$113,152**	**$3,212**	**$3,843**	**$789,214**	**$929,323**	**$0**

Table 3 - Low Income Weatherization Savings by Measure Category

Measure Category	Gross kWh Savings	Realization Rate	Adjusted Gross kWh Savings	Net to Gross Ratio	Net kWh Savings	Measure Life
Low Income Weatherization	182,237	100%	182,237	100%	182,237	30
Total	**182,237**	**100%**	**182,237**	**100%**	**182,237**	**30**

Table 4 - Low Income Weatherization Program Level Cost-Effectiveness Results (Load Shape – WA_Single_Family_Heat_Pump)

Cost-Effectiveness Test	Levelized $/kWh	Costs	Benefits	Net Benefits	Benefit/Cost Ratio
Total Resource Cost Test (PTRC) + Conservation Adder	$0.3083	$929,323	$184,126	-$745,197	0.20
Total Resource Cost Test (TRC) No Adder	$0.3083	$929,323	$167,387	-$761,935	0.18
Utility Cost Test (UCT)	$0.3083	$929,323	$167,387	-$761,935	0.18
Rate Impact Test (RIM)		$1,212,599	$167,387	-$1,045,211	0.14
Participant Cost Test (PCT)		$0	$1,072,490	$1,072,490	n/a
Lifecycle Revenue Impacts ($/kWh)					$0.0000085834
Discounted Participant Payback (years)					n/a

In addition to the energy benefits reported above, the Low Income program offers significant non-energy benefits (NEBs). Table 5 details the non-energy benefits and Table 6 provides the cost-effectiveness results.

Table 5 - Low Income Weatherization Non-Energy Benefits

Non-Energy Benefit	Program Impact	Perspective Adjusted
Home Repair Costs pd by Company	$34,868.61	PTRC, TRC
Economic Benefit	$706,285.27	PTRC, TRC
Arrearage	-$36,288.00	PTRC, TRC, UCT, RIM
Payment Assistance	$25,056.00	PTRC, TRC
Total	**$729,921.88**	-

Table 6 - Low Income Weatherization Program (with NEBs) Level Cost-Effectiveness Results (Load Shape – WA_Single_Family_Heat_Pump)

Cost-Effectiveness Test	Levelized $/kWh	Costs	Benefits	Net Benefits	Benefit/Cost Ratio
Total Resource Cost Test (PTRC) + Conservation Adder	$0.3083	$929,323	$914,048	-$15,275	0.98
Total Resource Cost Test (TRC) No Adder	$0.3083	$929,323	$897,309	-$32,013	0.97
Utility Cost Test (UCT)	$0.3083	$929,323	$131,099	-$798,223	0.14
Rate Impact Test (RIM)		$1,212,599	$131,099	-$1,081,499	0.11
Participant Cost Test (PCT)		$0	$1,072,490	$1,072,490	n/a
Lifecycle Revenue Impacts ($/kWh)					$0.0000088814
Discounted Participant Payback (years)					n/a

NAVIGANT

Memorandum

To: Esther Giezendanner and Brian Ludwig, PacifiCorp

From: David Basak, Navigant

Date: April 25, 2019

Re: Cost-Effectiveness Results for the Wattsmart Business Program - Washington

Navigant estimated the cost-effectiveness results for the Washington Wattsmart Business Program, based on 2018 costs and savings estimates provided by PacifiCorp. This memo provides the cost-effectiveness results for the overall program and for the 10 measure categories.

Cost-effectiveness was tested using the 2017 IRP decrement for all measure categories. The program passes PTRC, TRC, UCT and PCT cost-effectiveness tests. The memo consists of the following tables.

Table 1 - Utility Inputs
Table 2 – Annual Wattsmart Business Program Costs by Measure Category
Table 3 – Annual Wattsmart Business Program Savings by Measure Category
Table 4 - Benefit/Cost Ratios by Measure Category
Table 5 – Wattsmart Business Program Level Cost-Effectiveness Results
Table 6 - Wattsmart Business Additional Measures Cost-Effectiveness Results
Table 7 - Wattsmart Business Building Shell Cost-Effectiveness Results
Table 8 - Wattsmart Business Compressed Air Cost-Effectiveness Results
Table 9 - Wattsmart Business Energy Management Cost-Effectiveness Results
Table 10 - Wattsmart Business Farm & Dairy Cost-Effectiveness Results
Table 11 - Wattsmart Business HVAC Cost-Effectiveness Results
Table 12 - Wattsmart Business Irrigation Cost-Effectiveness Results
Table 13 - Wattsmart Business Lighting Cost-Effectiveness Results
Table 14 - Wattsmart Business Motors Cost-Effectiveness Results
Table 15 - Wattsmart Business Refrigeration Cost-Effectiveness Results

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Table 1 - Utility Inputs

Parameter	Value
Discount Rate	6.57%
Commercial Line Loss	9.53%
Industrial Line Loss	8.16%
Irrigation Line Loss	9.67%
Commercial Energy Rate ($/kWh)[1]	$0.0857
Industrial Energy Rate ($/kWh)[1]	$0.0698
Irrigation Energy Rate ($/kWh)[1]	$0.0920
Inflation Rate	2.20%

[1] Future rates determined using a 2.20% annual escalator.

Table 2 – Annual Wattsmart Business Program Costs by Measure Category

Measure Category	Engineering Costs	Utility Admin	Program Delivery	Program Dev.	Incentives	Inspection Cost	Total Utility Costs	Gross Customer Costs
Additional Measures	$30,583	$14,887	$862	$2,990	$53,271	$0	$102,593	$109,512
Building Shell	$0	$383	$3,444	$226	$21,525	$0	$25,578	$75,743
Compressed Air	$80,939	$38,172	$3,631	$7,531	$168,519	$0	$298,791	$339,268
Energy Mgmt.	$106,284	$32,345	$11,966	$14,131	$50,784	$0	$215,511	$60,240
Farm & Dairy	$0	$2,202	$26,564	$1,148	$20,765	$0	$50,678	$38,875
HVAC	$8,714	$5,959	$17,048	$1,910	$33,301	$0	$66,932	$92,479
Irrigation	$2,486	$6,869	$42,226	$2,322	$52,295	$0	$106,198	$121,489
Lighting	$0	$197,581	$1,349,407	$91,939	$1,629,515	$89,720	$3,358,161	$4,212,223
Motors	$3,385	$6,960	$15,502	$1,949	$42,279	$0	$70,076	$111,432
Refrigeration	$233,018	$94,608	$254,772	$49,630	$1,155,847	$0	$1,787,875	$2,151,831
Total	**$465,409**	**$399,966**	**$1,725,422**	**$173,776**	**$3,228,100**	**$89,720**	**$6,082,393**	**$7,313,091**

Table 3 – Annual Wattsmart Business Program Savings by Measure Category

Measure Category	Gross kWh Savings	Realization Rate	Adjusted Gross kWh Savings	Net to Gross Ratio	Net kWh Savings	Measure Life
Additional Measures	537,363	94%	505,121	100%	505,121	15
Building Shell	40,611	94%	38,174	100%	38,174	16
Compressed Air	1,353,235	96%	1,299,106	100%	1,299,106	14
Energy Management	2,539,217	100%	2,539,217	100%	2,539,217	3
Farm & Dairy	206,242	100%	206,242	100%	206,242	13
HVAC	343,286	100%	343,286	100%	343,286	15
Irrigation	417,195	100%	417,195	100%	417,195	12
Lighting	16,520,907	90%	14,868,817	100%	14,868,817	14
Motors	350,297	94%	329,279	100%	329,279	11
Refrigeration	8,918,159	100%	8,918,159	100%	8,918,159	15
Total	**31,226,512**	**94%**	**29,464,596**	**100%**	**29,464,596**	**13**

Table 4 - Benefit/Cost Ratios by Measure Category

Measure Category	PTRC	TRC	UCT	RIM	PCT
Additional Measures	1.70	1.55	2.40	0.47	4.32
Building Shell	0.30	0.27	0.84	0.33	0.80
Compressed Air	1.38	1.25	1.97	0.44	3.53
Energy Management	1.05	0.96	1.00	0.26	11.00
Farm & Dairy	1.39	1.26	1.71	0.37	5.28
HVAC	1.57	1.43	2.70	0.46	3.88
Irrigation	1.01	0.92	1.52	0.34	3.45
Lighting	1.22	1.11	1.97	0.39	3.61
Motors	0.95	0.86	1.71	0.38	2.59
Refrigeration	1.72	1.56	2.43	0.42	4.55
Total	**1.36**	**1.24**	**2.07**	**0.40**	**3.92**

Table 5 – Wattsmart Business Program Level Cost-Effectiveness Results

Cost-Effectiveness Test	Levelized $/kWh	Costs	Benefits	Net Benefits	Benefit/Cost Ratio
Total Resource Cost Test (PTRC) + Conservation Adder	$0.0352	$10,167,384	$13,835,031	$3,667,647	1.36
Total Resource Cost Test (TRC) No Adder	$0.0352	$10,167,384	$12,577,301	$2,409,917	1.24
Utility Cost Test (UCT)	$0.0211	$6,082,393	$12,577,301	$6,494,908	2.07
Rate Impact Test (RIM)		$31,536,043	$12,577,301	-$18,958,742	0.40
Participant Cost Test (PCT)		$7,313,091	$28,681,750	$21,368,659	3.92
Lifecycle Revenue Impacts ($/kWh)					$0.0000366109
Discounted Participant Payback (years)					1.68

Table 6 through Table 15 provide cost-effectiveness results for all 10 measures.

Table 6 - Wattsmart Business Additional Measures Cost-Effectiveness Results (Load Shape – WA_Miscellaneous_Mfg_General)

Cost-Effectiveness Test	Levelized $/kWh	Costs	Benefits	Net Benefits	Benefit/Cost Ratio
Total Resource Cost Test (PTRC) + Conservation Adder	$0.0290	$158,834	$270,672	$111,838	1.70
Total Resource Cost Test (TRC) No Adder	$0.0290	$158,834	$246,066	$87,232	1.55
Utility Cost Test (UCT)	$0.0187	$102,593	$246,066	$143,472	2.40
Rate Impact Test (RIM)		$522,541	$246,066	-$276,475	0.47
Participant Cost Test (PCT)		$109,512	$473,219	$363,707	4.32
Lifecycle Revenue Impacts ($/kWh)					$0.0000045545
Discounted Participant Payback (years)					1.55

Table 7 - Wattsmart Business Building Shell Cost-Effectiveness Results (Load Shape – WA_School_Space_Cool)

Cost-Effectiveness Test	Levelized $/kWh	Costs	Benefits	Net Benefits	Benefit/Cost Ratio
Total Resource Cost Test (PTRC) + Conservation Adder	$0.1836	$79,796	$23,614	-$56,182	0.30
Total Resource Cost Test (TRC) No Adder	$0.1836	$79,796	$21,467	-$58,329	0.27
Utility Cost Test (UCT)	$0.0588	$25,578	$21,467	-$4,111	0.84
Rate Impact Test (RIM)		$64,811	$21,467	-$43,344	0.33
Participant Cost Test (PCT)		$75,743	$60,758	-$14,985	0.80
Lifecycle Revenue Impacts ($/kWh)					$0.0000006691
Discounted Participant Payback (years)					25.79

Table 8 - Wattsmart Business Compressed Air Cost-Effectiveness Results (Load Shape – WA_Miscellaneous_Mfg_General)

Cost-Effectiveness Test	Levelized $/kWh	Costs	Benefits	Net Benefits	Benefit/Cost Ratio
Total Resource Cost Test (PTRC) + Conservation Adder	$0.0349	$469,540	$646,774	$177,234	1.38
Total Resource Cost Test (TRC) No Adder	$0.0349	$469,540	$587,976	$118,437	1.25
Utility Cost Test (UCT)	$0.0222	$298,791	$587,976	$289,185	1.97
Rate Impact Test (RIM)		$1,326,466	$587,976	-$738,490	0.44
Participant Cost Test (PCT)		$339,268	$1,196,194	$856,926	3.53
Lifecycle Revenue Impacts ($/kWh)					$0.0000130399
Discounted Participant Payback (years)					1.84

Table 9 - Wattsmart Business Energy Management Cost-Effectiveness Results (Load Shape – WA_Miscellaneous_Mfg_General)

Cost-Effectiveness Test	Levelized $/kWh	Costs	Benefits	Net Benefits	Benefit/Cost Ratio
Total Resource Cost Test (PTRC) + Conservation Adder	$0.0322	$224,966	$236,383	$11,417	1.05
Total Resource Cost Test (TRC) No Adder	$0.0322	$224,966	$214,894	-$10,072	0.96
Utility Cost Test (UCT)	$0.0308	$215,511	$214,894	-$617	1.00
Rate Impact Test (RIM)		$827,209	$214,894	-$612,315	0.26
Participant Cost Test (PCT)		$60,240	$662,482	$602,243	11.00
Lifecycle Revenue Impacts ($/kWh)					$0.0000504774
Discounted Participant Payback (years)					0.04

Table 10 - Wattsmart Business Farm & Dairy Cost-Effectiveness Results (Load Shape – WA_Irrigation_General)

Cost-Effectiveness Test	Levelized $/kWh	Costs	Benefits	Net Benefits	Benefit/Cost Ratio
Total Resource Cost Test (PTRC) + Conservation Adder	$0.0350	$68,788	$95,403	$26,615	1.39
Total Resource Cost Test (TRC) No Adder	$0.0350	$68,788	$86,730	$17,942	1.26
Utility Cost Test (UCT)	$0.0258	$50,678	$86,730	$36,052	1.71
Rate Impact Test (RIM)		$235,159	$86,730	-$148,429	0.37
Participant Cost Test (PCT)		$38,875	$205,246	$166,371	5.28
Lifecycle Revenue Impacts ($/kWh)					$0.0000028232
Discounted Participant Payback (years)					0.98

Table 11 - Wattsmart Business HVAC Cost-Effectiveness Results
(Load Shape – WA_School_HVAC_Aux)

Cost-Effectiveness Test	Levelized $/kWh	Costs	Benefits	Net Benefits	Benefit/Cost Ratio
Total Resource Cost Test (PTRC) + Conservation Adder	$0.0326	$126,109	$198,458	$72,348	1.57
Total Resource Cost Test (TRC) No Adder	$0.0326	$126,109	$180,416	$54,307	1.43
Utility Cost Test (UCT)	$0.0173	$66,932	$180,416	$113,485	2.70
Rate Impact Test (RIM)		$392,196	$180,416	-$211,780	0.46
Participant Cost Test (PCT)		$92,479	$358,565	$266,086	3.88
Lifecycle Revenue Impacts ($/kWh)					$0.0000034887
Discounted Participant Payback (years)					2.20

Table 12 - Wattsmart Business Irrigation Cost-Effectiveness Results
(Load Shape – WA_Irrigation_General)

Cost-Effectiveness Test	Levelized $/kWh	Costs	Benefits	Net Benefits	Benefit/Cost Ratio
Total Resource Cost Test (PTRC) + Conservation Adder	$0.0464	$175,392	$177,475	$2,083	1.01
Total Resource Cost Test (TRC) No Adder	$0.0464	$175,392	$161,341	-$14,051	0.92
Utility Cost Test (UCT)	$0.0281	$106,198	$161,341	$55,143	1.52
Rate Impact Test (RIM)		$472,649	$161,341	-$311,308	0.34
Participant Cost Test (PCT)		$121,489	$418,746	$297,257	3.45
Lifecycle Revenue Impacts ($/kWh)					$0.0000064162
Discounted Participant Payback (years)					1.82

Table 13 - Wattsmart Business Lighting Cost-Effectiveness Results
(Load Shape – WA_Miscellaneous_Lighting)

Cost-Effectiveness Test	Levelized $/kWh	Costs	Benefits	Net Benefits	Benefit/Cost Ratio
Total Resource Cost Test (PTRC) + Conservation Adder	$0.0388	$5,940,870	$7,268,431	$1,327,562	1.22
Total Resource Cost Test (TRC) No Adder	$0.0388	$5,940,870	$6,607,665	$666,795	1.11
Utility Cost Test (UCT)	$0.0219	$3,358,161	$6,607,665	$3,249,503	1.97
Rate Impact Test (RIM)		$16,949,774	$6,607,665	-$10,342,110	0.39
Participant Cost Test (PCT)		$4,212,223	$15,221,127	$11,008,905	3.61
Lifecycle Revenue Impacts ($/kWh)					$0.0001826165
Discounted Participant Payback (years)					2.11

Table 14 - Wattsmart Business Motors Cost-Effectiveness Results
(Load Shape – WA_Miscellaneous_Mfg_General)

Cost-Effectiveness Test	Levelized $/kWh	Costs	Benefits	Net Benefits	Benefit/Cost Ratio
Total Resource Cost Test (PTRC) + Conservation Adder	$0.0475	$139,229	$131,819	-$7,411	0.95
Total Resource Cost Test (TRC) No Adder	$0.0475	$139,229	$119,835	-$19,394	0.86
Utility Cost Test (UCT)	$0.0239	$70,076	$119,835	$49,760	1.71
Rate Impact Test (RIM)		$316,528	$119,835	-$196,693	0.38
Participant Cost Test (PCT)		$111,432	$288,731	$177,299	2.59
Lifecycle Revenue Impacts ($/kWh)					$0.0000044233
Discounted Participant Payback (years)					2.78

Table 15 - Wattsmart Business Refrigeration Cost-Effectiveness Results
(Load Shape – WA_Grocery_Refrigeration)

Cost-Effectiveness Test	Levelized $/kWh	Costs	Benefits	Net Benefits	Benefit/Cost Ratio
Total Resource Cost Test (PTRC) + Conservation Adder	$0.0288	$2,783,859	$4,786,001	$2,002,142	1.72
Total Resource Cost Test (TRC) No Adder	$0.0288	$2,783,859	$4,350,910	$1,567,051	1.56
Utility Cost Test (UCT)	$0.0185	$1,787,875	$4,350,910	$2,563,035	2.43
Rate Impact Test (RIM)		$10,428,710	$4,350,910	-$6,077,800	0.42
Participant Cost Test (PCT)		$2,151,831	$9,796,682	$7,644,851	4.55
Lifecycle Revenue Impacts ($/kWh)					$0.0001001218
Discounted Participant Payback (years)					1.32

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Appendix 2
Washington Measure Installation Verifications

Washington Measure Installation Verifications

Home Energy Savings

Site inspections by Program Administrator staff for the following retrofit and/or new homes measures. Inspections are performed on >=5 percent of single family homes, >=5 percent of manufactured homes, 100 percent of multifamily projects, and 20 percent of new homes projects.

- Air sealing
- Central air conditioning best practices installation and sizing
- Duct sealing
- Duct sealing and insulation
- Ductless heat pumps
- Heat pump conversion
- Heat pump upgrade
- Heat pump performance tested comfort systems, commissioning, controls, and sizing
- Heat pump water heaters
- Insulation (attic, floor, wall)
- Whole Homes Performance Path

No site inspections are conducted for the following measures. However, all post-purchase incented measures undergo a quality assurance review prior to the issuance of the customer/dealer incentive and recording of savings (e.g. proof of purchase receipt review) and eligible equipment review. Additionally, customer account and customer address are checked to ensure the Company does not double pay for the same measure or double count measure savings.

- Central air conditioners
- Clothes washers
- Electric water heaters
- Evaporative coolers
- Freezers
- Light fixtures (post-purchase)
- Refrigerators
- Smart thermostats
- Windows

No site inspections are conducted for the following measures, which are delivered via an upstream, manufacturer buy-down model. Promotion agreement contracts are signed with manufacturers and retailers to set incentive levels, final product prices, and limits to the total number of units that can be purchased per customer. Program Administrator verifies measures for product eligibility and correct pricing. Pricing is also verified by Program Administrator field visits to retail locations.

- CFL bulbs
- LED bulbs
- Light fixtures (upstream)
- Room air conditioners

Customer eligibility for wattsmart Starter Kits is verified using the customer's account number and last name and cross-verifying with the current PacifiCorp customer database.

Low Income Weatherization

All projects

- All measures are qualified through US Department of Energy approved audit tool or priority list.
- 100 percent inspection by agency inspector of all homes treated, reconciling work completed and quality (corrective action includes measure verification) prior to invoicing Company.
- State inspector follows with random inspections.

The Company hires independent inspector to inspect between 5-10 percent of homes treated (post treatment and payment).

wattsmart Business

Lighting projects (typical upgrades, small business and midmarket/instant incentive offer)

- Retrofits - 100 percent pre- and post-installation site inspections of all projects with incentives over a specified dollar amount. Project cost documentation reviewed for all projects.
- New construction - 100 percent post-installation site inspections of all projects with incentives over a specified dollar amount.
- A percent of post-installation site inspections by program administrator of projects with incentives under a specified dollar amount. For the midmarket/instant incentive offer, these inspections are done by phone.

For typical upgrades, required inspections are performed by a third party consultant. For the small business and instant incentive offers, required inspections are performed by the program administrator.

Non-lighting projects (typical upgrades/listed measures where savings is deemed)

- 100 percent of applications with an incentive that exceeds a specified dollar amount will be inspected (via site inspection) (typically by program administrator).
- A minimum of a specified percent of remaining non-lighting applications will be inspected, either in person or via telephone interview, (typically by program administrator).

Non-lighting projects (typical upgrades/listed measures where savings is determined using a simplified analysis tool)

- 100 percent of applications with project savings that exceeds a specified threshold will be inspected (via site inspection) (typically by program administrator).
- A minimum of a specified percent of remaining non-lighting applications will be inspected, either in person or via telephone interview, (typically by program administrator).

Custom projects

- 100 percent pre/post-installation inspections, invoice reconciled to inspection results. On-site pre/post inspections are required for projects with savings over a specified threshold. For projects with savings below the threshold, inspection information may be collected by phone or email.
- No pre-inspection for new construction.

- Inspections are conducted by third party energy engineering firms for the in-house project manager/consultant delivery channel.
- Inspections are conducted by outsourced delivery team for projects delivered by third party outsourced program delivery teams.

All Programs

As part of the third-party program evaluations (two-year cycle) process, the Company has implemented semi-annual customer surveys to collect evaluation-relevant data more frequently to cure for memory loss and other detractors such as customers moving and data not be readily available at evaluation time). This will serve as a further check verifying customer participation and measures installed.

Additional record reviews and site inspections (including metering/data logging) is conducted as part of the process and impact evaluations, a final verification of measure installations.

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Appendix 3
Home Energy Savings Retailers

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Table 1[1]
Participating Upstream/Midstream Lighting Retailers and Redemptions

The Company worked with 30 lighting retailers in 2018 to promote efficient lighting. Table 1 lists the retailer and the type of redemption(s) provided.

Retailer	City	State	LEDs	Fixtures
Ace Hardware - Stein's #7047	Yakima	WA	x	x
Ace Hardware #15365	Kennewick	WA	x	
Ace Hardware #14426	Naches	WA	x	
Batteries Plus 250	Kennewick	WA	x	
Best Buy #831	Yakima	WA	x	
Best Buy 590	Kennewick	WA	x	
Bi-Mart #619	Walla Walla	WA	x	x
Costco 486	Kennewick	WA	x	x
Costco #1013	Union Gap	WA	x	x
Dollar Tree #2387	Yakima	WA	x	
Dollar Tree #2696	Kennewick	WA	x	
Dollar Tree #5342	Yakima	WA	x	
Dollar Tree #5863	Walla Walla	WA	x	
Dollar Tree #3450	Kennewick	WA	x	
Dollar Tree #4295	Yakima	WA	x	
Fred Meyer #163	Kennewick	WA	x	
Home Depot #4727	Yakima	WA	x	x
Home Depot #4735	College Place	WA	x	x
Home Depot #4739	Kennewick	WA	x	x
Hometown Ace Hardware #11909	Yakima	WA	x	x
Lowe's #249	Kennewick	WA	x	
Lowe's #3240	Yakima	WA	x	x
Roy's Ace Hardware #10640	Yakima	WA	x	
Target 830	Kennewick	WA	x	
True Value (Helms)	Selah	WA	x	
True Value Hardware – Country Farm and Garden	Yakima	WA	x	
True Value Hardware #5353	Selah	WA	x	
Wal-Mart - Supercenter #2101	Kennewick	WA	x	
Wal-Mart - Supercenter #5078	Yakima	WA	x	x
Wal-Mart #2269	Yakima	WA	x	x

[1] To be considered as a participating retailer for discounted lighting products, the retailer's sales coming from Pacific Power customers must be a significant majority of their total sales.

Table 2
Participating Upstream/Midstream Retailers and Redemptions

Table 2 provides the list of 2018 participating Upstream/Midstream retailer and the product types that were redeemed at each location.

Retailer	City	State	Room Air Conditioners
There was no Room Air Conditioner participation in 2018.			

Table 3
Downstream Retailers

Eleven **participating** retailers provided redemptions for downstream clothes washers, evaporative coolers, self-installed heat pump water heaters, attic insulation, floor insulation, wall insulation, smart thermostats, and window.

Participating Retailer (Retailers who are actively enrolled in the program)	City	State	Clothes Washer	Evaporative Cooler - Tier 2	Heat Pump Water Heater, Self-installed	Insulation-Attic	Insulation-Floor	Insulation-Wall	Smart Thermostat	Windows
Bemis Home Appliance & Tv Ctr	Yakima	WA	x							
Best Buy #831	Yakima	WA	x						x	
Costco #1013	Union Gap	WA							x	
Elgin's Appliance Center	Milton-Freewater	WA	x							
Home Depot #4727	Yakima	WA	x	x	x	x	x	x	x	
Home Depot #4735	College Place	WA	x		x	x			x	x
Home Depot #4739	Kennewick	WA		x						
Lowe's #3240	Yakima	WA	x		x	x			x	
Lowe's of Pasco	Pasco	WA	x							
Sears #2029	Union Gap	WA	x							
Sears #6914	Walla Walla	WA	x							

Twenty-six **non-participating** retailers provided redemptions for downstream clothes washers, evaporative coolers, heat pump water heaters, attic insulation, floor insulation, wall insulation, smart thermostats, and windows. Some retailers are located outside Pacific Power's service territory. However, the customer resides with the service territory.

Redemptions from Non-Participating Retailer's (*Retailer may not be located in the service territory)	City	State	Clothes Washer	Evaporative Cooler - Tier 2	Heat Pump Water Heater, Self-installed	Insulation-Attic	Insulation-Floor	Insulation-Wall	Smart Thermostat	Windows
APEX Plumbing	Yakima	WA			x					
Ace Hardware Corporation	Oak Brook	IL			x					
Amazon.com	Seattle	WA							x	
Bed Bath & Beyond #1332	Union Gap	WA							x	
BestBuy.com	N/A		x						x	
Bi-Rite Lumber Co of Washington	Sunnyside	WA						x		
Costco.com	N/A		x						x	
Costco #486	Kennewick	WA							x	
Ecobee.com	Toronto	ON							x	
Google, Inc.	Mountain View	CA							x	
Home Depot	Baton Rouge	LA		x						
Home Depot #1808	Lewiston	ID	x							
Home Depot #4746	Richland	WA	x							
HomeDepot.com	N/A		x						x	
The Home Depot Inc.	Atlanta	GA			x					
Keller Supply Company #11	Union Gap	WA			x					
Kohls.com	Middletown	OH							x	
Lowe's Home Centers Inc.	Spokane Valley	WA			x					
Lowes.com	N/A		x						x	x
Nest.com	Palo Alto	CA							x	
Prudential Builders Center	Spokane	WA	x							
Sears	Ann Arbor	MI	x							
Sears #5578	Logan	UT	x							
Sears.com	N/A		x							
Target.com	Minneapolis	MN							x	
Whirlpool.com	N/A		x							

Table 4
HVAC Trade Ally

The Company worked with 30 HVAC trade allies. Some trade allies are located outside Pacific Power's service territory. However, the customer resides with the service territory.

Trade Ally (Trade ally may be located outside of the territory)	City	State	Central Air Conditioner	Duct Sealing	Duct Sealing and Duct Insulation	Electric System to Heat Pump	Heat Pump to Heat Pump Upgrade	Heat Pump - PTCS Commissioning, Controls, and Sizing	Heat Pump, Ductless
Absolute Comfort Technology, LLC	Yakima	WA				x	x		x
AccuTemp Heating and Air Conditioning	Yakima	WA				x			
All Seasons Heating & Air Conditioning	Yakima	WA	x			x	x		x
Allard Enterprises	Yakima	WA					x		
American Air Heating and Conditioning	Walla Walla	WA				x	x		x
A-One Refrigeration & Heating	Kennewick	WA					x		
Blaze to Blizzard Heating & Cooling	Walla Walla	WA							x
Campbell & Company	Pasco	WA		x		x	x	x	x
Chapman Heating & Air Conditioning Inc	Dayton	WA							x
Chinook Heating & Air Inc	Kennewick	WA					x		
CK Home Comfort Systems	Grandview	WA				x	x		
College Place Heating & Air Conditioning	College Place	WA	x	x		x	x		x
Comfort Pro's Heating & Air Conditioning	Yakima	WA			x				
Dayco Inc	Kennewick	WA				x	x	x	
Farwest Climate Control	Yakima	WA	x			x	x		x
Four Seasons HVAC	Yakima	WA				x	x		x
Grassi Refrigeration	Walla Walla	WA							x
Jacobs & Rhodes, Inc.	Kennewick	WA				x			
Miller & Team Heating & AC	Zillah	WA							x
Panchos Heating & Cooling LLC	Kennewick	WA				x	x		
Paul's Air F/X	Yakima	WA							x
Polar Heating & Air Conditioning	Selah	WA					x		
Quality Comfort	Yakima	WA							x
Smith Insulation	Walla Walla	WA		x	x				
ThermAll Heating & Cooling Inc	Yakima	WA			x	x	x		x
Thermex Valley Heating and AC	Yakima	WA							x
TNG Heating & Refrigeration	Zillah	WA				x			
Total Comfort Solutions, LLC	Walla Walla	WA	x			x	x	x	x
Vance Heating and AC	Yakima	WA	x			x	x	x	x
Young's Heating & Cooling, LLC	Walla Walla	WA				x	x		x

Table 5
Manufactured Homes Trade Ally

Trade Ally Name (Trade ally may be located outside of the territory)	City	State	Manufactured Homes Duct Sealing	Energy Star/Eco-Rated Manufactured Homes
Clayton Homes	Union Gap	WA		x
Columbia Homes	Union Gap	WA		x
Gillespie Homes	Kennewick	WA		x
Home Energy Experts	Clearfield	UT	x	
Smith Insulation	Walla Walla	WA	x	
Stout Homes Inc	Lewiston	ID		x
Sunrise Home Center, Inc.	Clarkston	WA		x
Valley Quality Homes	Yakima	WA		x

Table 6
Plumbing Trade Ally

Table 6 lists 6 plumbing trade allies the Company worked with to promote efficient plumbing technologies.

Trade Ally Name (Trade ally may be located outside of the territory)	City	State	Heat Pump Water Heaters
AccuTemp Heating and Air Conditioning	Yakima	WA	x
Bulz-I Plumbing Inc.	Walla Walla	WA	x
Burke's Plumbing	Selah	WA	x
Ray's Plumbing, Inc.	Yakima	WA	x
RossCo Plumbing	Yakima	WA	x
Shephard Plumbing, LLC	Yakima	WA	x

Table 7
Weatherization Trade Ally

Table 7 lists 7 weatherization trade allies the Company worked with.

Trade Ally Name (Trade ally may be located outside of the territory)	City	State	Air Sealing	Insulation-Attic	Insulation-Floor	Insulation-Wall	Windows
Chon Insulation and Drywall	Walla Walla	WA		x			
Don Jordan Energy Systems	Yakima	WA		x	x		
Insul Homes	Yakima	WA		x			
Intermountain West Insulation	Kennewick	WA		x	x	x	
K-5 Contracting, Inc.	Yakima	WA		x			
McKinney Glass Inc.	Yakima	WA					x
Smith Insulation	Walla Walla	WA	x	x	x	x	

Table 8
Applications by Customer City and Measure Category

Customer City	% of All Applications	% of Appliance Applications	% of HVAC Applications	% of Manufactured Homes Applications	% of Kits Applications
BROWNSTOWN	0.02%	0.00%	0.10%	0.00%	0.00%
BUENA	0.16%	0.00%	0.00%	0.00%	0.24%
BURBANK	0.78%	0.00%	0.86%	2.63%	0.79%
COLLEGE PLACE	3.50%	5.45%	2.88%	10.53%	3.41%
COWICHE	0.31%	0.00%	0.00%	0.00%	0.41%
DAYTON	1.83%	2.73%	2.02%	5.26%	1.58%
DIXIE	0.16%	0.00%	0.19%	0.00%	0.17%
GRANDVIEW	2.70%	0.91%	0.96%	0.00%	3.51%
GRANGER	0.99%	0.00%	0.38%	0.00%	1.31%
HARRAH	0.07%	0.00%	0.10%	0.00%	0.07%
MABTON	0.89%	0.00%	0.00%	2.63%	1.27%
MOXEE	2.35%	3.64%	4.32%	5.26%	1.65%
NACHES	1.55%	0.00%	0.58%	0.00%	2.07%
OUTLOOK	0.26%	0.91%	0.29%	0.00%	0.24%
PARKER	0.02%	0.00%	0.00%	0.00%	0.03%
POMEROY	0.85%	0.91%	0.00%	2.63%	1.17%
PRESCOTT	0.33%	0.00%	0.29%	0.00%	0.31%
PROSSER	0.05%	0.00%	0.00%	0.00%	0.07%
SELAH	6.53%	7.27%	6.05%	13.16%	6.57%
SUNNYSIDE	3.97%	3.64%	0.86%	0.00%	4.99%
TIETON	1.03%	0.91%	0.48%	0.00%	1.24%
TOPPENISH	1.48%	0.00%	0.48%	0.00%	2.00%
Toppenish Ave	0.02%	0.00%	0.00%	2.63%	0.00%
TOUCHET	0.35%	0.91%	0.67%	2.63%	0.21%
UNION GAP	2.33%	0.91%	3.84%	0.00%	1.96%
WAITSBURG	1.08%	2.73%	0.48%	0.00%	1.14%
WALLA WALLA	15.37%	23.64%	13.45%	10.53%	14.56%
WAPATO	2.44%	1.82%	0.58%	7.89%	3.20%
WHITE SWAN	0.09%	0.00%	0.00%	0.00%	0.14%
YAKIMA	46.39%	42.73%	58.79%	31.58%	43.30%
ZILLAH	2.07%	0.91%	1.34%	2.63%	2.38%

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Appendix 4

*watt*smart Business Vendor Network

wattsmart® Business Vendor Network

The following is a list of contractors, distributors, manufacturers and other vendors participating in Pacific Power's wattsmart® Business Vendor Network displayed in random order (unless sorted by the user) based on the search criteria selected. This listing is provided solely as a convenience to our customers. Pacific Power does not warrant or guarantee the work performed by these participating vendors. You are solely responsible for any contract with a participating vendor and the performance of any vendor you have chosen.

Search Criteria:

State(s)	[Washington]
Program(s)	[Commercial]
Specialties	[Appliances, Building envelope, Compressed air, Controls – HVAC, Controls – Lighting, Farm and dairy, Food service, HVAC - evaporative, HVAC - unitary, Irrigation, Lighting, Lighting instant incentives, Motors and VFDs, Office equipment, Other Specialty, Small business lighting]
Service Address	
Business Name	

Search Results: 30 record(s) found

About Us	Service Areas	Company Name	Contact Information	Specialty	Business Type	Projects Completed	Distance (miles)
Premium Vendor Learn More: https://wattsmartbusiness.com/premiumvendors/ces-sunnyside/	Washington	**Columbia Electric Supply** Address: 3211 Allen Rd Sunnyside, WA 98944 Website: https://www.ced-columbia.com	Phone: Name: Tye Kaple Email: tkaple@ces-sunnyside.com	Controls – Lighting, Lighting, Motors and VFDs	Distributor	6	
Premium Vendor	Washington	**Stusser Yakima** Address: 116 N. 2nd Ave. Yakima, WA 98902 Website: https://www.www.com	Phone: 509-453-0378 Name: Steve DiBenedetto Email: steved@stusseryakima.com	Lighting, Lighting instant incentives	Distributor	6	

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	Washington	**Platt Electric Supply - Yakima** Address: 16 S. 1st Avenue Yakima, WA 98902 Website: http://www.platt.com	Phone: 509-452-6444 Name: Jeremy Sandino Email: jlsandino@platt.com	Lighting, Lighting instant incentives	Distributor	42
	Washington	**MH Electric Inc.** Address: P.O. Box 11224 Yakima, WA 98909 Website:	Phone: 509-452-6039 Name: Walt Wenda Email: ww@mhelectricinc.com	Lighting, Motors and VFDs, Small business lighting	Contractor	24
	Washington	**ecomodus, LLC** Address: 5110 Tieton Drive Yakima, WA 98908 Website:	Phone: 509-307-4363 Name: Dan Richards Email: ecomodus@msn.com	Lighting	Other	20
	Washington	**Core Northwest LLC** Address: 1413 River Road Yakima, WA 98902 Website: http://www.corenorthwest.com	Phone: 509-248-2673 Name: Rod Cassel Email: rod@corenorthwest.com	Controls – Lighting, Irrigation, Lighting, Motors and VFDs	Contractor	18
	Washington	**Walla Walla Electric*** Address: 1225 W. Poplar Walla Walla, WA 99362 Website: http://www.wwelectric.com	Phone: 509-525-8672 Name: Spike Teal Email: spike@wwelectric.com	Lighting, Small business lighting	Contractor	11
	Washington	**Lumenal Lighting LLC** Address: 21706 66th Ave W Mountlake Terrace, WA 98043 Website: https://www.Lumenal.com	Phone: Name: Don Nielsen Email: service@lumenal.com	Controls – Lighting, Lighting	Contractor	6
	Washington	**Knobel's** Address: 801 Tennant ln Yakima, WA 98901 Website:	Phone: 509-452-9157 Name: Steve Soderstrom Email: knobelselectric@msn.com	Lighting, Motors and VFDs, Small business lighting	Contractor	5

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	Washington	**All-Phase Electric, Inc.** Address: 2500 S 12th Ave Union Gap, WA 98903 Website: http://allphaseelectric.org	Phone: 509-454-5093 Name: Andrew Lea Email: andrew@allphaseelectric.org	Lighting, Motors and VFDs	Contractor	4
	Washington	**CED - Yakima** Address: 131 S 1st Ave YAKIMA, WA 98903 Website:	Phone: 509-248-0872 Name: Dan Derosier Email: DAN@CEDYAKIMA.COM	Lighting, Lighting instant incentives	Distributor	4
	California, Washington	**Leidos Engineering, LLC.** Address: 301 Plainfield Rd. Suite 310 Syracuse, NY 13212 Website: https://energy.leidos.com/	Phone: 855-926-7543 Name: Christopher Piechuta Email: AMPLIFY@Leidos.com	Appliances, Compressed air, Controls – Lighting, Food service, HVAC - evaporative, HVAC - unitary, Lighting, Motors and VFDs, Office equipment, Other Specialty	Engineering Firm	4
	Washington	**Columbia Electric Supply - Walla Walla** Address: 932 N 13TH AVE Walla Walla, WA 99362 Website: http://www.ced-columbia.com/	Phone: 509-522-1419 Name: Daron Waldon Email: dwalden@ces-ww.com	Lighting, Motors and VFDs	Distributor	3
	Washington	**KIE Supply** Address: 113 E Columbia Dr Kennewick, WA 99336 Website: https://www.kiesupply.com	Phone: 509-582-5156 Name: Leigh Kluthe Email: leigh@kiesupply.com	Controls – Lighting, Lighting	Distributor	3
	Washington	**Platt Electric - Walla Walla** Address: 415 west main Walla Walla, WA 99362 Website: https://www.platt.com	Phone: 509-522-0611 Name: Robert Kinion Email: robert.kinion@platt.com	Lighting, Lighting instant incentives	Distributor	3

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	Washington	**Stoneway Electric Supply - Yakima** Address: 23 N. 3rd Ave Yakima, WA 98902 Website: http://www.stoneway.com/	Phone: 509-469-6154 Name: Tyler Hicks Email: tyler.hicks@stoneway.com	Controls – Lighting, Lighting, Lighting instant incentives, Motors and VFDs	Distributor	2
	Washington	**Columbia Electric Supply** Address: 1913 Washington Street Pasco, WA 99301 Website: http://www.columbiaelectricsupplypasco.com	Phone: 509-547-9733 Name: Teri Bostock Email: twade@ces-pasco.com	Controls – Lighting, Lighting, Motors and VFDs	Distributor	2
	California, Washington	**BidEnergy Inc.** Address: 1628 JFK Blvd, Ste 2100 Philadelphia, PA 19103 Website: http://bidenergy.com	Phone: 215-732-4480 Name: Timothy Mayo Email: tim.mayo@bidenergy.com	Appliances, Building envelope, Controls – Lighting, Food service, HVAC - evaporative, HVAC - unitary, Lighting, Motors and VFDs, Office equipment	Other	1
	Washington	**Young's Heating and Cooling LLC** Address: 878 Wallula Ave Walla Walla, WA 99362 Website: www.youngsheating.com	Phone: 509-525-4328 Name: Erik Young Email: mail@youngsheating.com	Controls – HVAC, HVAC - evaporative, HVAC - unitary, Motors and VFDs	Contractor	1
	Washington	**Lake Shore Electric, Inc.** Address: 9702 Tieton Drive Yakima, WA 98908 Website: http://www.lakeshoreelectric.com	Phone: 509-965-4281 Name: Bill Ross Email: billjr@lakeshoreelectric.com	Lighting, Motors and VFDs	Contractor	1
	Washington	**North Coast Electric - Yakima** Address: 215 N 3rd Ave Building A Yakima, WA 98902 Yakima, WA 98902 Website: http://www.northcoastelectric.com	Phone: 630-639-3084 Name: Jay Claussner Email: JClaussn@nclec.com	Controls – Lighting, Lighting, Lighting instant incentives	Distributor	1

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	Washington	**Batteries Plus Bulbs - Walla Walla** Address: 632 S 9th Ave Walla Walla, WA 99362 Website: https://www.batteriesplus.com/	Phone: 509-924-6645 Name: Michelle Russell Email: mrussell@batteriesplus.net	Lighting, Lighting instant incentives	Distributor
	Washington	**LED SUPPLY CO** Address: 12340 W Cedar Dr Lakewood, CO 80228 Website: https://www.ledsupplyco.com/	Phone: Name: Ian Skolnick Email: orders@ledsupplyco.com	Lighting instant incentives	Other
	Washington	**Batteries Plus Bulbs - Kennewick** Address: 321 N Columbia Center Blvd. Kennewick, WA 99336 Website: https://www.batteriesplus.com/	Phone: 509-783-3400 Name: Kristie Midili Email: mgr250@batteriesplus.net	Lighting, Lighting instant incentives	Distributor
	Washington	**Bulbs** Address: 243 Stafford St Worcester, MA 01603 Website: https://www.bulbs.com/contactus.aspx	Phone: Name: Bulbs Bulbs Email: customerservice@bulbs.com	Lighting instant incentives	Other
	Washington	**Batteries Plus Bulbs - Yakima** Address: 1731 South 1st Street Yakima, WA 98901 Website: https://www.batteriesplus.com	Phone: 509-571-1322 Name: Jessie Hottell Email: mgr654@batteiresplus.net	Lighting, Lighting instant incentives	Distributor
	California, Washington	**Transformative Wave** Address: 1012 Central Ave S Kent, WA 98032 Website: http://transformativewave.com/	Phone: 253-867-2333 Name: Joe Schmutzler Email: joe.s@twavetech.com	Controls – HVAC, HVAC - unitary, Motors and VFDs	Distributor

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	California, Washington	**Forever Green Indoors** Address: 1314 S Grand Blvd, Ste 2, #127 Spokane, WA 99202 Website: http://www.forevergreenindoors.com	Phone: 800-630-7345 Name: Kathleen Sullivan Email: ksullivan@forevergreenindoors.com	Lighting	Distributor, Manufacturer - Rep
	Washington	**eledlights** Address: 7835 Wilkerson Court San Diego, CA 92111 Website: https://www.eledlights.com/	Phone: 215-607-6830 Name: Landon Landon Email: lights@eledlights.com	Lighting instant incentives	Other
	Washington	**ShineRetrofits** Address: 1550 Larimer St Denver, CO 80202 Website: https://www.shineretrofits.com/	Phone: 877-643-4534 Name: Shine Retrofits Email: sales@shineretrofits.com	Lighting instant incentives	Other

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*watt*smart® Business - Washington

LED Instant Incentives - Approved Distributors

wattsmart Business LED Instant Incentives

LED instant incentives make the investment in this technology easy, and we're covering up to 70 percent of the cost to purchase qualifying LED lamps. Instant incentives are available for select, easy-to-install LEDs that fit in many existing light fixtures. Speak to your lighting distributor about the right kind of lamps for your fixtures.

Below is a list of approved lighting distributors that can assist you through the LED selection, incentive and purchase process. Please visit bewattsmart.com for more information.

Distributor Name	Branch Address	Phone Number	Website
Batteries Plus Bulbs	321 N. Columbia Center Blvd. Kennewick, WA 99336	509-783-3400	www.batteriesplus.com
	1731 South 1st Street Yakima, WA 98901	509-571-1322	
	632 S 9th Ave Walla Walla, WA 99362	509-529-7001	
CED	1920 Fowler St Richland, WA 99352	509-737-8282	www.cednw.com
	131 S First Ave Yakima, WA 98902	509-248-0872	
North Coast Electric	215 N. 3rd Ave, Bldg A Yakima, WA 98902	509-452-2221	www.northcoastelectric.com
	1928 W. A St Pasco, WA 99301	509-547-9514	
Platt Electric	16 S. 1st Ave Yakima, WA 98902	509-452-6444	www.platt.com
	100 Stover Loop Rd, Ste A Grandview, WA 98930	509-882-1616	
	415 W. Main St Walla Walla, WA 99362	509-522-0611	
Stoneway	44 S Palouse Street Walla Walla, WA 99362	509-522-1550	www.stoneway.com
	23 N 3rd Ave Yakima, WA 98902	509-469-6154	
	630 Railroad Street Richland, WA 99352	509-943-4664	
Stusser	116 N 2nd Ave Yakima, WA 98902	509-453-0378	N/A

*The Approved Distributor list is subject to change. If you have questions about the LED Instant Incentive or require assistance finding an Approved Distributor in your area please contact 1-800-222-4335.
**Pacific Power does not warrant the performance of qualifying purchased equipment or the quality of the product sold by the Approved Distributor.

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Premium *watt*smart® Business Lighting Vendors Washington

Winter 2018

PACIFIC POWER

POWERING YOUR GREATNESS



The wattsmart Business Vendor Network is a resource for Pacific Power customers to find qualified and knowledgeable vendors to help with their energy efficiency projects. Vendors on our list meet Network requirements such as holding appropriate licenses and insurance, having knowledge of lighting technology and the wattsmart Business program and having good business references.

Continued on the other side

PACIFIC POWER
POWERING YOUR GREATNESS

The following Vendors earned Premium Vendor status based on their top performance in the Network:

Columbia Electric Supply, Sunnyside
Sunnyside, WA
Lighting Distributor
Phone: 509-837-6033
Email: **tkaple@ces-sunnyside.com**
Online: **www.ced-columbia.com**

Stusser Electric, Yakima
Yakima, WA
Lighting Distributor
Phone: 509-453-0378
Email: **steved@stusseryakima.com**

We update the list of Premium Vendors quarterly based on the previous 12 months of wattsmart Business participation. Top performing Vendors are selected based on:

- Program participation
- Project quality
- Application submission quality
- Industry training (e.g. achieving NXT Level 1 designation)
- Customer and program feedback

To find a complete searchable list of wattsmart Business Vendors, visit **bewattsmart.com**. We do not guarantee the work performed by these participating vendors. You are responsible for any contract or the performance of any vendor you have chosen.

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Continued on the other side

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Appendix 5
Communications

Energy Efficiency Communications 2018

Creative *(click on the hyperlinks below to see the creative)*

TV

- Washington winter 68-degree :30 – English
- Washington winter 68-degree :15 – English
- Washington winter 68-degree :30 – Spanish
- Washington winter 68-degree :15 – Spanish

- Washington summer 78-degree – English
- Washington summer 78-degree :15 – English
- Washington summer 78-degree :30 – Spanish

- Washington efficiency for business customers" Baker"
- Washington hidden savings for business customers "Vet"

Radio

- Washington Better :60 – English
- Washington Better :60 – Spanish
- Incentives for Lighting and lighting controls for businesses

Print

- Yakima summer – "Good"
- Yakima summer– "Helps
- Yakima summer 78-degrees – "Better"
- Walla Walla summer – "Good"
- Walla Walla summer– "Helps"
- Walla Walla summer 78-degrees – "Better"
- Spanish winter "Bueno"
- Spanish summer "Bueno"
- Spanish summer "Ayuda"
- Spanish summer "Meyor"
- Farm Bureau ad – color
- Irrigation – color
- Ad to thank business customers and vendors for being wattsmart last year

- LED Lighting and Controls for business b/w
- LED Lighting and Controls for business color

Digital Ads

- Pandora residential– "Helps" winter screen ad | Pandora recorded ad
- Pandora business – "Good" for your bottom line screen ad | Pandora recorded ad
- Cooling – ceiling fan
- Cooling – 78-degree thermostat
- Being wattsmart is "good"
- Being wattsmart "helps"
- Being wattsmart is "better"
- Energy efficiency is GOOD for your bottom line and Washington - business

Social

- Facebook and YouTube video thumbnail - winter
- Winter wattsmart tips 68 degrees Facebook ads – English - February
- Winter wattsmart tips 68 degrees Facebook ads – Spanish - February
- Facebook and YouTube video thumbnail - summer
- Cooling – ceiling fan
- Cooling – thermostat

Press releases:

- Winter Energy Bill Savings – December 12, 2018
- Pexco Aerospace wattsmart Business Partner of the Year – November 2018
- Headed Out of Town This Weekend? Save Energy by Putting Your Home in Summer Vacation-mode – August 31, 2018
- Heat Wave: Tips from Pacific Power to Be Safe, Stay Cool and Use Less Energy – July 13, 2018
- Pacific Power gives Customers the Power to Save - June 25, 2018

Newsletters:

- February Voices newsletter
- July Connect newsletter
- October Connect newsletter

Direct mail:

- Home Energy Report postcard
- Mailing to irrigation customers encouraging application for incentives:
  - Letter – April
  - Application – April
  - LESA flyer – April
  - Letter – October
  - Application – October
  - VFD Flyer – October
- Small business outreach postcard – December 2018

Emails:

- Smart thermostat September email – version 1
- Smart thermostat September email – version 2
- Black Friday smart thermostat email
- Thank you for being wattsmart last year - January
- wattsmart Business lighting 2/28/18

Collateral:

- wattsmart Business - overview
- wattsmart Business – overview (Spanish)
- wattsmart Business - brochure
- wattsmart Business – instant incentives for lighting
- wattsmart Business – HBC Finance Overview
- wattsmart Small Business lighting incentives
- wattsmaert Small Business lighting incentives (Spanish)
- wattsmart Business – Energy Project Manager Co-funding
- wattsmart Business – Energy Management
- wattsmart Business – Advanced Rooftop Controls
- wattsmart Business wastewater incentives

2018

NEF

BE *WATT*SMART, BEGIN AT HOME

WASHINGTON

Program Report

Prepared for:



Barbara Modey, Customer and Community Communications

Michael S. Snow, Manager, Regulatory Projects

PacifiCorp

825 NE Multnomah, Suite 800

Portland, OR 97232

Prepared by:

Patti Clark

Program Director

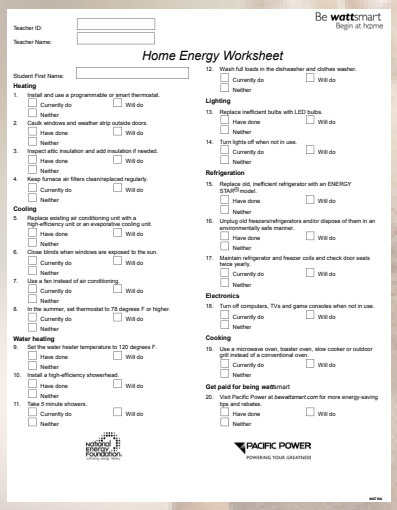
National Energy Foundation

4516 South 700 East, Suite 100

Salt Lake City, UT 84107

February 25, 2019

Savings



Be wattsmart
Begin at home

Teacher ID:

Teacher Name:

Home Energy Worksheet

Student First Name:

Heating

1. Install and use a programmable or smart thermostat.
   ☐ Currently do ☐ Will do ☐ Neither
2. Caulk windows and weather strip outside doors.
   ☐ Have done ☐ Will do ☐ Neither
3. Inspect attic insulation and add insulation if needed.
   ☐ Have done ☐ Will do ☐ Neither
4. Keep furnace air filters clean/replaced regularly.
   ☐ Currently do ☐ Will do ☐ Neither

Cooling

5. Replace existing air conditioning unit with a high-efficiency unit or an evaporative cooling unit.
   ☐ Have done ☐ Will do ☐ Neither
6. Close blinds when windows are exposed to the sun.
   ☐ Currently do ☐ Will do ☐ Neither
7. Use a fan instead of air conditioning.
   ☐ Currently do ☐ Will do ☐ Neither
8. In the summer, set thermostat to 78 degrees F or higher.
   ☐ Currently do ☐ Will do ☐ Neither

Water heating

9. Set the water heater temperature to 120 degrees F.
   ☐ Have done ☐ Will do ☐ Neither
10. Install a high-efficiency showerhead.
    ☐ Have done ☐ Will do ☐ Neither
11. Take 5 minute showers.
    ☐ Currently do ☐ Will do ☐ Neither
12. Wash full loads in the dishwasher and clothes washer.
    ☐ Currently do ☐ Will do ☐ Neither

Lighting

13. Replace inefficient bulbs with LED bulbs.
    ☐ Have done ☐ Will do ☐ Neither
14. Turn lights off when not in use.
    ☐ Currently do ☐ Will do ☐ Neither

Refrigeration

15. Replace old, inefficient refrigerator with an ENERGY STAR® model.
    ☐ Have done ☐ Will do ☐ Neither
16. Unplug old freezers/refrigerators and/or dispose of them in an environmentally safe manner.
    ☐ Have done ☐ Will do ☐ Neither
17. Maintain refrigerator and freezer coils and check door seals twice yearly.
    ☐ Currently do ☐ Will do ☐ Neither

Electronics

18. Turn off computers, TVs and game consoles when not in use.
    ☐ Currently do ☐ Will do ☐ Neither

Cooking

19. Use a microwave oven, toaster oven, slow cooker or outdoor grill instead of a conventional oven.
    ☐ Currently do ☐ Will do ☐ Neither

Get paid for being wattsmart

20. Visit Pacific Power at *bewattsmart.com* for more energy-saving tips and rebates.
    ☐ Have done ☐ Will do ☐ Neither

National Environmental Education Foundation

PACIFIC POWER
POWERING YOUR GREATNESS

Home Energy Worksheets

– Returned: 2,179 –

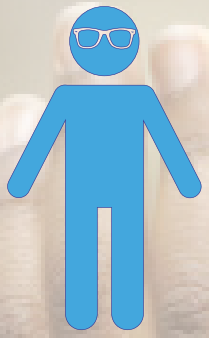
– 60% –

Teacher Packets

– Returned: 106 –

– 71% –

Participants



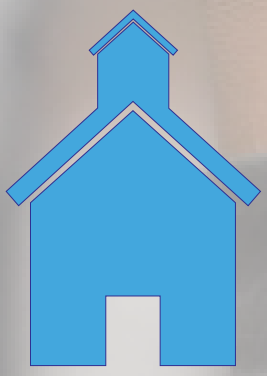
Students

– 3,647 –



Teachers

– 150 –



Schools

– 47 –

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Program Overview

Program Description

Be *watt*smart, Begin at home, an energy efficiency education program, is a collaborative partnership between Pacific Power and the National Energy Foundation (NEF). This unique and interactive program teaches the importance of energy and natural resources and their impact on the environment. The objective is to expand and promote energy awareness through a school-based education program which encourages Washington students and teachers to change behaviors which will impact the energy consumption in their homes and community. Teachers are also provided teaching materials to support further classroom instruction on this valuable message. A total of 47 schools participate in the program.

Program Administration

Be *watt*smart, Begin at home is administered by NEF, a non-profit organization (established in 1976) dedicated to the development, dissemination and implementation of supplementary educational materials, programs and services relating primarily to energy, energy safety, the environment and natural resources. Our mission remains constant, to cultivate and promote an energy literate society. NEF is pleased to report on activities of the Be *watt*smart, Begin at home energy efficiency education program conducted during the 2018 – 2019 school year.

Anne Lowe, Vice President – Operations, oversees program organization. Gary Swan, Vice President – Development, oversees contract accounting. Patti Clark, Program Director, is responsible for overseeing and implementing the scope of work and Megan Hirschi is responsible for scheduling the presentations. A team of trained and seasoned presenters brought the interactive, hands-on program to Washington schools during October and November of 2018.

Building Collaborations

The Washington Office of Superintendent of Public Instruction Learning Standards correlate well to the content of Be wattsmart, Begin at home program and appropriately with the 4th grade standards. Teachers appreciate the collaborative efforts to align program components to their core curriculum. Curriculum correlations were provided to teacher participants in the *Teacher Guide* delivered to each teacher prior to the presentation date.

Program Implementation

During the month of May 2018 an invitation to register for the fall 2018 program was sent via email to all teachers that had participated in the 2017 program. In August and September, Megan Hirschi made phone calls to all unregistered schools. Teacher questions were addressed and highlights of the program content with an emphasis on how the program aligns with Washington content standards were reviewed.

Program Registration

Registration for the program was online at bewattsmart.com/begin. Each registered school was checked against the qualified school list before email and phone communications were made with teachers to determine optimum presentation dates and student numbers.

After registration was qualified, a series of email communications with teachers, was sent automatically by the program registration website. The website calculated *Home Energy Worksheet* returns as well as earned mini-grant levels and communicated this information to the participating teachers. Later communications were customized through programming to be sent only to teachers needing a reminder to return their program documents.

Be *watt*smart, Begin at home Presentation

Be *watt*smart, Begin at home presentations were given during the month of October through the first week of November 2018. The presentation featured a custom Keynote slideshow that brought energy concepts to the

forefront of Washington education. The presentation focused on important concepts, such as natural resources, electrical generation, the energy mix used by Pacific Power to generate electricity and tips for energy efficiency in the home.

The presentation provided interactive activities that involved and engaged the audience. Students participated in making a human electrical circuit, during which they learned key core curriculum concepts such as insulators and conductors of electricity and electrical generation. Student volunteers used props to demonstrate the process of electrical generation for their classmates. All students reviewed material learned with an "Energy Lingo" review activity at designated points throughout the presentation. To help students remember energy efficiency tips, participants viewed "Caitlynn Power" energy efficiency video vignettes produced by PacifiCorp. These videos were new to the program this year and were well received by both teachers and students. At the end of each short video, students learned a rhyme about Caitlyn's wise energy choices to help them remember the concept.

The last portion of the presentation communicated the importance of the program take-home pieces. These documents enabled households to participate in energy education along with the students.

Program Materials

A *Parent Letter* was provided to explain the importance of Be *watt*smart, Begin at home. In addition, students took home a *Student Guide* and *Home Energy Worksheet* to share with their families. Students who returned their worksheet received an LED nightlight featuring the Pacific Power logo as a reward.

Educators were also given helpful energy educational materials. Each teacher participant was provided a custom Be *watt*smart, Begin at home folder. The folder contained a custom *Teacher Guide* with additional information and activities to supplement and continue energy education in the classroom. Also, in the folder were two NEF instructional posters, *Energy Efficiency* and *Electricity Serves Our Community.*

A program *Implementation Steps Flier* assisted teachers in carrying out the program. It also gave simple steps for successfully returning *Home Energy Worksheets* and the sponsor *Thanks a "Watt" Card* in the postage paid envelope provided in the *Teacher Materials Folder*. A *Rewarding Results Flier* gave information concerning the mini-grant teacher participants would receive for returning their student surveys. Educators received a $50 gift card for an 80% return, or a $25 gift card for a 50 – 79% return by the December 5, 2018 deadline.

Program Accomplishments – Fall 2018

- 47 Be *watt*smart, Begin at home presentations
- 3,647 students and families reached
- 150 Washington teachers reached
- 60% student *Home Energy Worksheet* surveys return
- $50 mini-grant checks delivered to 83 Washington teachers
- $25 mini-grant checks delivered to 18 Washington teachers

Program Improvements - Fall 2018

- Updated all program materials with new Pacific Power style guide and look
- New video vignettes entitled "Caitlin Power" produced by sponsor for presentation
- Updated the *Energy Efficiency* instructional poster
- New LED nightlight incentive with Pacific Power logo
- Added online *Home Energy Worksheet* option to program
- *Program Evaluation* completed online by teachers

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Program Attachments – Fall 2018

- Fall 2018 Participating Schools
- Program Promotions
- Program Documents
    - Keynote Presentation
    - *Teacher Implementation Steps Flier*
    - *Rewarding Results Flier*
    - *Student Guide*
    - *Teacher Guide*
    - Lingo Card
    - *Parent Letter*
- *Teacher Evaluation* Compilation
- *Home Energy Worksheet*
- *Home Energy Worksheet* Summary – Pacific Power
- Wise Energy Behaviors in Pacific Power Washington Homes
- Sampling of Thanks a "Watt" Cards

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Attachments

Fall 2018 Participating Schools

School Name	School Address	City	State	Zip
Adams Elementary - Wapato	1309 S. Camas Avenue	Wapato	WA	98951
Adams Elementary - Yakima	723 S. 8th St.	Yakima	WA	98901
Ahtanum Valley Elem School	3006 S. Wiley Rd	Yakima	WA	98903
Arthur H. Smith Elementary	205 Fir Avenue	Grandview	WA	98930
Artz-Fox Elementary	805 Washington	Mabton	WA	98935
Barge Lincoln	219 East I Street	Yakima	WA	98901
Blue Ridge Elementary	1150 W. Chestnut	Walla Walla	WA	99362
Chief Kamiakin Elementary	1700 E. Lincoln Ave	Sunnyside	WA	98944
Christ the Teacher Catholic School	5508 W. Chestnut Ave.	Yakima	WA	98908
Cottonwood Elementary	1041 S. 96th Ave	Yakima	WA	98908
Davis Elementary	31 SE Ash St	College Place	WA	99324
Dayton Elementary	302 E. Park St.	Dayton	WA	99328
Discovery Lab School	2810 Castlevale	Yakima	WA	98902
East Valley Elementary	1951 Beaudry Rd.	Yakima	WA	98901
Edison Elementary	1315 E. Alder	Walla Walla	WA	99362
Garfield Elementary - Toppenish	505 Madison Ave	Toppenish	WA	98948
Gilbert Elementary	4400 Douglas Drive	Yakima	WA	98908
Green Park Elementary	1105 E. Isaacs Street	Walla Walla	WA	99362
Harriet Thompson Elementary	1105 W. 2nd St.	Grandview	WA	98930
Hoover Elementary	400 West Viola Avenue	Yakima	WA	98902
Martin Luther King Jr.	2000 S 18th Street	Union Gap	WA	98903
McClure Elementary - Grandview	811 W. 2nd	Grandview	WA	98930
McClure Elementary - Yakima	1222 S. 22nd Ave	Yakima	WA	98902
McKinley Elementary	621 S. 13th Ave	Yakima	WA	98902
Montessori School of Yakima	511 N 44th Ave	Yakima	WA	98902
Naches Valley Elementary	151 Bonlow Drive	Naches	WA	98937
Nob Hill Elementary	801 South 34th Avenue	Yakima	WA	98902
Oakridge Montessori School	6403 Summitview Ave	Yakima	WA	98902
Outlook Elementary	3800 Van Belle Rd	Outlook	WA	98938
Prospect Point Elementary	55 Reser Road	Walla Walla	WA	99362
Ridgeview Elementary	609 West Washington Ave	Yakima	WA	98903
Riverside Christian School	721 Keys Road	Yakima	WA	98901
Robertson Elementary	2707 West Lincoln	Yakima	WA	98902
Rogers Adventist School	200 SW Academy Way	College Place	WA	99324
Roosevelt Elementary – Granger	701 E. Avenue	Granger	WA	98932
Roosevelt Elementary - Yakima	120 N. 16th Avenue	Yakima	WA	98902
Satus Elementary	910 S. Camas Ave	Wapato	WA	98951
Sharpstein Elementary	410 S. Howard St.	Walla Walla	WA	99362
St Joseph-Marquette School	202 N. 4th St	Yakima	WA	98901
Terrace Heights Elementary	101 N. 41st Street	Yakima	WA	98901
Tieton Intermediate School	711 Franklin Road	Tieton	WA	98947
Union Gap	3201 South 4th Street	Union Gap	WA	98903
Valley View Elementary	515 Zillah Ave	Toppenish	WA	98948
Waitsburg Elementary	184 Academy	Waitsburg	WA	99361
Whitney Elementary	4411 W. Nob Hill Blvd.	Yakima	WA	98908
Wide Hollow Elementary	1000 S. 72nd Ave	Yakima	WA	98908
Zillah Intermediate	303 2nd Ave	Zillah	WA	98953

Program Promotions



Be ***watt***smart
Begin at home

Be *watt*smart, Begin at home reinforces electricity learning standards in an engaging and interactive assembly. Participating teachers receive free energy education posters, activities and student materials as well as the chance to receive a mini-grant of up to $50, depending on participation.

Presentations will be held from October 1 to November 2, 2018. Sign up today at be*watt*smart.com/begin.

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Program Documents

Keynote Presentation

Be **watt**smart
Begin at home



PACIFIC POWER
POWERING YOUR GREATNESS

We have the power to learn.

Learn about natural resources.

Learn how we make and use energy.

Learn how to use energy wisely by being **watt**smart.

Play energy LINGO.



POWERING YOUR GREATNESS

What is **ENERGY**?

POWERING YOUR GREATNESS

ENERGY is the ability to do WORK.





POWERING YOUR GREATNESS

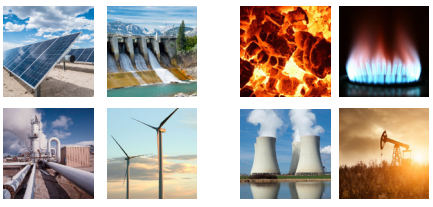
Natural resources

A **natural resource** is anything we use that comes from the earth or the sun.



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Renewable and nonrenewable resources



POWERING YOUR GREATNESS

Renewable resources






POWERING YOUR GREATNESS

Nonrenewable resources






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Let's LINGO

Find the words on your LINGO board that match these definitions:

- The ability to do work. **Energy**
- A resource often found with oil. **Natural gas**
- Something useful from the earth or the sun. **Natural resource**

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Electricity



- The electricity we use is not a natural resource.
- It is made from natural resources.
- Since electricity is made from natural resources, it is called a secondary energy source.
- Power lines carry the electricity from where it is generated to where it is used.

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Pacific Power

Electric generation by energy source

Coal 58.89% 

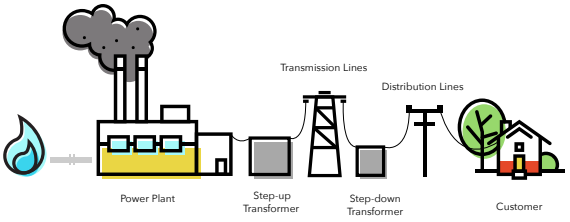
Renewables 19.95%    

Natural gas 10.57% 

Other sources 10.59%

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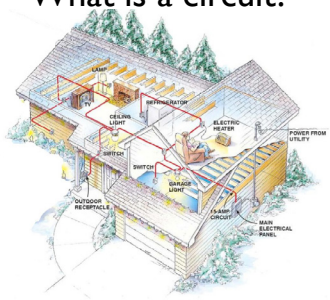
Electric generation



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What is a circuit?



Let's make a circuit.

What things do we need to make an electrical circuit?

- An **energy source**, such as a battery.
- A **conductor** to carry electrical energy, such as wire.
- A **load** to use the energy, such as a light bulb.



Open circuit:
No electricity can flow

Closed circuit:
Electricity can flow

Energy efficiency

Energy efficiency

- Using less energy to accomplish the same amount of work.

Technology

- Install energy-efficient products, appliances and devices.

Behavior

- Use less energy through wise behaviors that conserve energy.

Let's LINGO

Find the words on your LINGO board that match these definitions:

- Using less energy to accomplish the same amount of work. **Energy efficiency**
- An energy resource that is capable of being renewed or is replaceable. **Renewable**
- Fossil fuels – such as coal, natural gas and oil – are considered **Nonrenewable** resources.
- A resource used to produce gasoline. **Oil**



Caitlynn Power



Caitlynn Power

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Caitlynn Power

POWERING YOUR GREATNESS

Home heating and cooling



What can you do to be ***watt***smart?

- Use a fan instead of an air conditioner.

Remind your parents to:



- Install a smart or programmable thermostat.
- Change furnace filters.
- Insulate your home and seal air leaks.

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Caitlynn Power

POWERING YOUR GREATNESS



Caitlynn Power

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Water heating

What can you do to be ***watt***smart?



- Take shorter showers.
- Turn off the water when brushing teeth.
- Set your **water heater** to 120°F.
- Install an energy-efficient showerhead.

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What else can you do to be ***watt***smart?



- Use advanced power strips to reduce **phantom** loads.
- Use a microwave oven when possible.
- Use lids to shorten **cooking** time.



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The 3 Rs

What can you do to be ***watt***smart?

- **Reduce**
  – use less of something.
- **Reuse**
  – use something again.
- **Recycle**
  – make something into another new thing.



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Let's LINGO

Find the words on your LINGO board that match these definitions:

- A light that can last 25 times longer than an incandescent. **LED**
- Electricity consumed by an electronic device while it is turned off or in standby mode. **Phantom load**
- Using a toaster oven or microwave for **Cooking** is more energy-efficient than using the oven.
- Set this to 120°F for a comfortable shower. **Water heater**
- To use less of something. **Reduce**

POWERING YOUR GREATNESS

What have we done today?

- Learned why energy is important.
- **Discussed** energy and where it comes from.



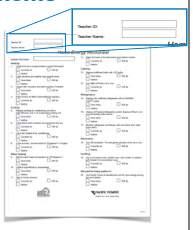
POWERING YOUR GREATNESS

Engage in energy efficiency

Review your **Be *watt***smart**, Begin at home** booklet with your parent(s).

Complete the *Home Energy Worksheet* either online or return it to your teacher to receive an energy-efficient nightlight.

Sign the *Thanks A "Watt" Card* and your teacher will mail it along with your worksheet.



POWERING YOUR GREATNESS



YOU *have the* ***power*** *to be* ***watt***smart**!**

Visit **bewattsmart.com**
for more energy-saving ideas.

POWERING YOUR GREATNESS





Implementation Steps

1. Verify that you have received each of the following:
   - *Teacher Materials Folder*
   - Your **Be wattsmart, Begin at home** *Teacher Guide*
   - *Home Energy Worksheets* for you and your students
   - **Be wattsmart, Begin at home** student booklets
   - Set of *Parent Letters*
   - *watt*smart nightlights (student incentive for completing the *Home Energy Worksheet*)
2. Distribute to each student a:
   - **Be wattsmart, Begin at home** student booklet
   - *Home Energy Worksheet*
   - *Parent Letter*
3. Reward each student who completes a *Home Energy Worksheet,* either online or paper, with a *watt*smart nightlight.
4. Have each student sign the *Thank You Card* to Pacific Power.
5. Mail in the self-addressed postage-paid envelope:
   - any completed *Home Energy Worksheets*
   - the *Thank You Card*

To thank you for postmarking your envelope by December 5, 2018, you will receive a mini-grant for classroom use.
80 percent or greater return of registered students' *Home Energy Worksheets* **= $50**
50 – 79 percent return of registered students' *Home Energy Worksheets* **= $25**

For questions, or additional information, please email Megan Hirschi at **megan@nef1.org**.

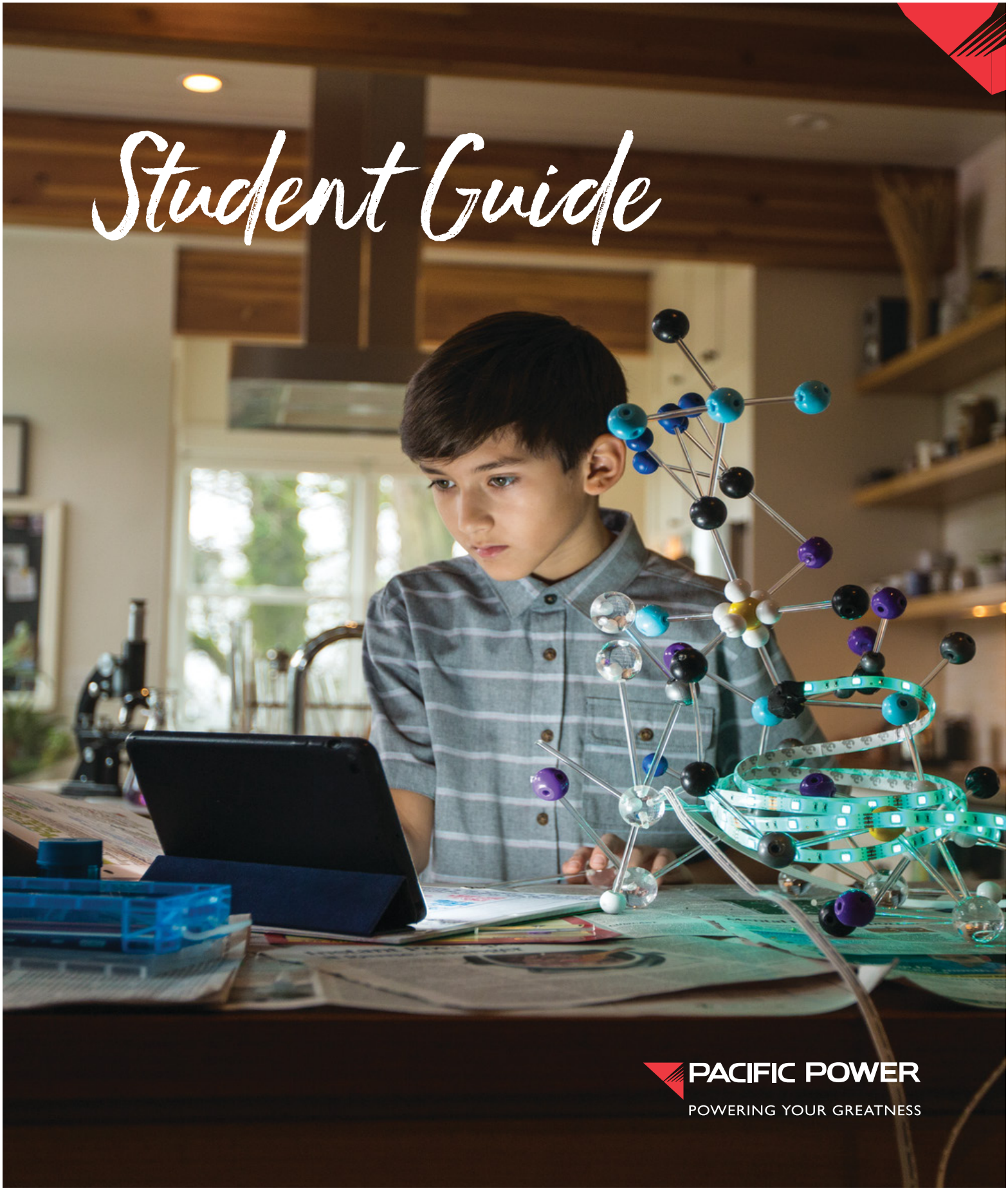
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cultivating energy literacy

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Attention Teachers
Help us out by mailing your student *Home Energy Worksheets* and receive a **$25 – $50** mini-grant for classroom use, depending upon participation.
80 percent or greater return of registered students' *Home Energy Worksheets* = $50
50 – 79 percent return of registered students' *Home Energy Worksheets* = $25
Postmark due date:
December 5, 2018
Offer open only to teachers participating in Be wattsmart, Begin at home. Certain restrictions may apply. Good while grant funding is in place. *Home Energy Worksheets* must be completed for eligibility. For more information, contact Megan Hirschi at megan@nef1.org.
NEF
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Dear Parents,

The **Be wattsmart, Begin at home** program assists teachers and students to learn about energy, discuss important energy topics and engage in energy efficiency actions now. Your child has participated in a presentation addressing natural resources, energy basics and energy efficiency. Your participation in this program will help you be wattsmart, enhance energy efficiency in your home and help save money on your utility bills. Here are three simple ways that you can help:

- Review this **Be wattsmart, Begin at home** booklet with your child.
- Assist your child with completing the activities on Page 7.
- Have your child complete the ***Home Energy Worksheet*** online or return it to his or her teacher.

Thank you for being *watt*smart and for your participation!

What's inside?

This booklet is divided into three sections that will give you the power to:

1. Learn about sources of energy, how they get to your home and why they are important in your life.
2. Discuss wattsmart energy efficiency tips that will help you use energy wisely and save money.
3. Engage in energy efficiency by determining how energy can be saved in your home through a simple audit activity and the *Home Energy Worksheet*.

About Pacific Power

Pacific Power is committed to the delivery of reliable electric service that's safe, low-cost and increasingly from clean, renewable resources. Serving more than 700,000 customers in Washington, Oregon and California, the company is one of the lowest cost energy producers in the nation. Pacific Power is moving toward a sustainable energy future that includes increased use of solar, wind and other renewable resources; and provides customers with more choices to meet their energy needs.

About the National Energy Foundation

The National Energy Foundation (NEF) is a 501 (c)(3) nonprofit organization, founded in 1976. It is dedicated to increasing energy literacy through the development, distribution and implementation of educational programs and materials. These resources relate primarily to energy, natural resources, energy efficiency, energy safety and the environment. Concepts are taught through science, math, art, technology and writing. NEF recognizes the importance of educating individuals about energy so they can make informed decisions about energy issues and use.

I have the *power* to be ***watt***smart.

- Being wattsmart is all about taking steps to save energy – which in turn can help you save money.
- You have the power to become more energy efficient. Pacific Power can help with wattsmart programs and incentives for homes and businesses. Saving energy also saves money and is good for the environment.



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I have the power to *learn.*



The importance of energy:

Energy is the ability to do work or produce change. Virtually everything we do or use at work and home uses energy.

- Heating and cooling systems
- Computers
- Electronic equipment such as gaming and entertainment systems and TVs
- Charging electronic tablets, music players and cell phones
- Appliances
- Lights
- Food storage and preparation
- Security systems

Where does energy come from?

Our energy comes from natural resources. There are two general categories of natural resources – nonrenewable and renewable. A nonrenewable resource is not capable of being renewed, replaced or takes a very long time to replace. A renewable resource is capable of being renewed or replaced.

Primary natural resources are used to convert energy into electricity. They can be either nonrenewable or renewable.

Nonrenewable examples are:



Coal is the most abundant nonrenewable energy source in the world. There is an estimated 129 year supply remaining.



Oil can be both refined and unrefined. Refined oil is transformed into petroleum products and unrefined oil remains as crude oil.



Natural Gas is usually captured alongside oil deposits and is a major source for electrical generation.



Uranium is the fuel most widely used by nuclear plants. Nuclear energy is the energy inside the nucleus (core) of the atom of uranium.

Renewable examples are:



Solar is energy from the sun.



Wind is energy from the wind captured by a group of wind turbines (generators).



Geothermal is energy derived from the heat of the earth.



Hydropower is energy from water that generates electricity.

Secondary energy resources are created by using nonrenewable and renewable resources of energy.



Electricity is the most abundant secondary energy resource used. It is the flow of electrical power or charge. It occurs in nature as lightning and static electricity. A generator uses energy resources to create mechanical energy that is then converted into electrical energy.

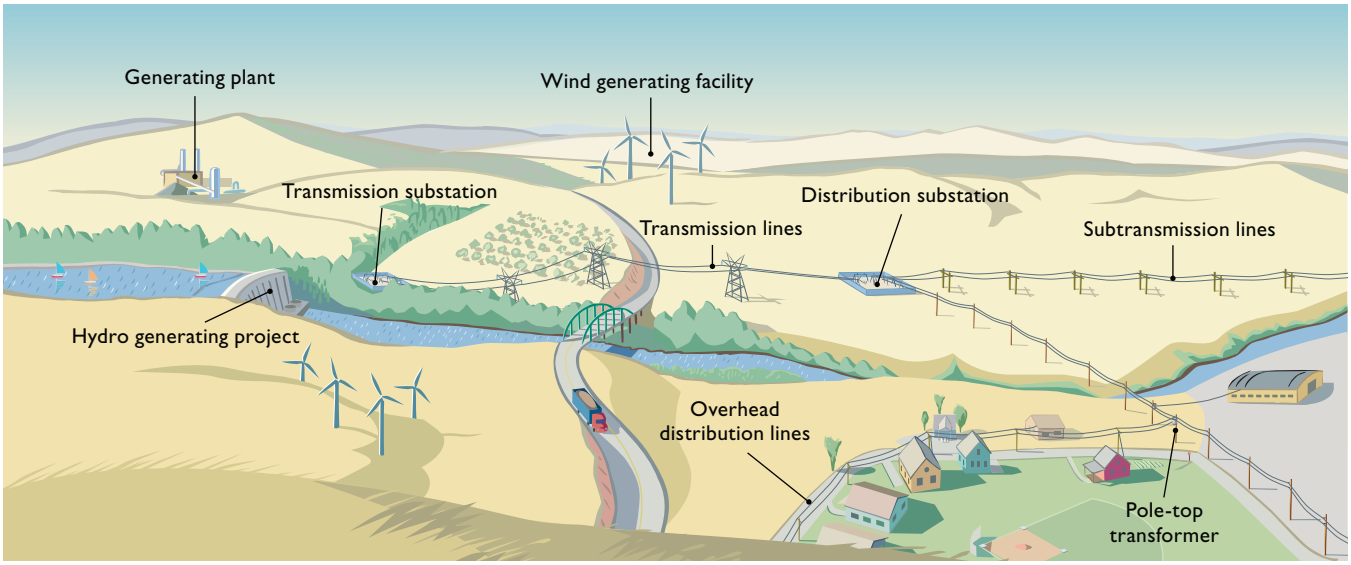
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Energy efficiency

Energy efficiency is using less energy to accomplish the same amount of work – we call it being wattsmart. There are many technologies we can use today that decrease the amount of energy needed to do work. Good examples are ENERGY STAR® products and LED lighting.

You can save even more money if you start thinking about using energy wisely. Try turning off the lights when you leave the room, take shorter showers or turn off your electronics when you are not using them.

Using electricity



For more than 100 years, electricity has made our homes more comfortable and industries more productive. Today electricity is powering a world of electronics.

How is electricity generated? It begins with a fuel that heats water and turns it to steam. The steam drives the turbine that turns the generator motor to produce electricity.

How is electricity transmitted? Once the electricity is produced, the current flows from the generator to the power plant transformer where the voltage is increased to boost the flow of the electric current through the transmission lines. The transmission lines transport the electricity to Pacific Power's substations where the voltage is decreased. Power lines then carry the electricity from the substations to be used in our homes and businesses.

ELECTRICAL GENERATION

Energy Source	Pacific Power (2017 Basic Fuel Mix)*	United States (U.S. EPA, data)
Natural Gas	10.57%	32%
Coal	58.89%	30%
Nuclear	0.00%	20%
Petroleum	0.00%	1%
Other/misc.	10.59%	0%
Renewables (total)	19.95%	17%
Hydropower	7.09%	7.5%
Wind	8.56%	6.3%
Biomass	0.37%	1.6%
Solar	3.54%	1.3%
Geothermal	0.39%	0.4%

**This information is based on Federal Energy Regulatory Commission Form 1 data. The Pacific Power "basic fuel mix" is based on energy production and not resource capability, capacity or delivered energy. All or some of the renewable energy attributes associated with wind, solar, biomass, geothermal and qualifying hydro facilities in Pacific Power's basic fuel mix may be: (a) used in future years to comply with renewable portfolio standards or other regulatory requirements, (b) sold to third parties in the form of renewable energy credits and/or other environmental commodities or (c) excluded from energy purchased. Pacific Power's basic fuel mix includes owned resources and purchases from third parties.*

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I have the power to *discuss* energy use to help save money.

Saving energy happens in two ways. First, you can use less energy through wise behaviors that conserve energy. Second, you can install energy-efficient products, appliances and devices that use less energy to accomplish the same task. Let's talk about the following areas of your home that have the largest potential to save energy.

Home heating and cooling



- Install a programmable thermostat or smart thermostat. Set your thermostat to 78°F or higher in the summer and 68°F or lower in the winter.
- Make sure your house is properly insulated. If you have less than 6 inches of insulation in your attic, you would benefit from adding more.
- You can save 10 percent or more on your energy bill by reducing the air leaks in your home with caulking and weather stripping.



- To help your furnace run more efficiently and cost-effectively, keep your air filters clean.
- For windows with direct sunlight, close your blinds in the summer to keep the heat out. Open them on winter days to let the warmth in.
- Small room fans are an energy-efficient alternative to air conditioning.
- For information about energy-saving programs and cash incentives, visit **bewattsmart.com**.

Water and water heating



- Check your faucets for leaks that can cost you hundreds of dollars each year.
- Install a water-efficient showerhead and save as much as $145 a year.
- Set the water heater at 120°F.
- Install faucet aerators to decrease water use.

Lighting

- Let the sun shine in. Use daylight and turn off lights.



- Replace your incandescent bulbs with LEDs (light-emitting diodes) and save $5 to $8 per year per bulb. These bulbs use up to 80 percent less energy than incandescent bulbs and last much longer.
- Use lighting controls such as motion detectors and timers.
- Turn off lights when you leave the room.
- Always use the lowest wattage bulb that still gives you the light you need.
- Keep your light bulbs clean. It increases the amount of light from the bulb and reduces the need to turn on more lights.

Electronics

- Turn off your computer and game consoles when not in use.
- Home electronics are made to turn on and off many times. Always turn them off to save energy.
- Electronics with the ENERGY STAR® label use as much as 60 percent less energy while providing the same performance.
- Beware of phantom loads which continue to draw electricity when they are plugged in but not in use. Examples are telephone chargers, electronic games and television sets.
- Use advanced power strips for household electronics. One button will turn off multiple appliances, which conserves electricity.



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Refrigerators and freezers



- When looking to replace your old refrigerator, do so with an ENERGY STAR® model, which requires approximately 40 percent less energy than conventional models and provides energy savings without sacrificing the features you want.
- Clean door gaskets with warm water or a detergent that leaves no residue.

Dishwashers

- Only run dishwashers when full and use the "air dry" or "no heat dry" settings.
- ENERGY STAR® dishwashers use at least 41 percent less energy than the federal minimum standard for energy consumption.

Laundry

- Buy a moisture-sensitive dryer that automatically shuts off when clothes are dry.
- Use a drying rack whenever possible.

Cooking

- Use a microwave oven, toaster oven or slow cooker instead of a conventional oven.
- Use the right-sized pan for the stove top element.
- Cover pans with lids to keep heat from escaping.

Reduce

- Use less.
- Purchase products with little packaging.

Reuse

- Use something again.
- Reuse a box or a grocery bag.

Recycle

- Make something into another new item.
- Participate in the recycling programs in your community.



I have the power to *engage* in energy efficiency.

Parents, be *watt*smart and watch the energy savings add up.

An individual with a combined electric and heating fuel bill of $2,500 per year could save 20 percent or $42/month by using these and other energy efficiency tips. That is like getting a pay raise without having to work harder or longer.

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The cost of lighting your home

Take a walk around your home with your family to learn about your lighting.

1. Count the types of bulbs in each room and record in Table 1; then total each column.
2. Transfer the total for each type of lighting into Column A on Table 2.

TABLE 1

Location	Incandescent	CFL	LED
Bedroom 1			
Bedroom 2			
Kitchen			
Dining room			
Living room			
Hallway			
Laundry room			
Family room			
Front porch			
Other			
TOTAL			

3. In Table 2, multiply the numbers in Column A by the given amounts in Column B. Place the answers in Column C.
4. Add the numbers in Column C to get the total approximate cost of electricity for lighting your home.
5. Discover how much money you will save if all the bulbs in your home were CFLs or LEDs. Add the numbers in Column A to get the total number of bulbs in your home. Transfer the total to both rows in Table 3, Column E as indicated by the arrows.
6. Multiply the total number of CFLs by the annual cost of electricity for one CFL provided in Column F and put your answer in Column G.
7. In the last row of Table 3, multiply the total number of LEDs in Column E by the annual cost of electricity for one LED bulb provided in Column F and put your answer in Column G.

   How do the amounts in Column G compare with your current total cost for lighting in Column C above?

TABLE 2

	A	B	C
	Number of bulbs from Table 1	Annual cost of electricity for one bulb	Annual cost of electricity for lighting
Incandescent		× $3.96	
CFL		× $0.84	
LED		× $0.48	
TOTAL			

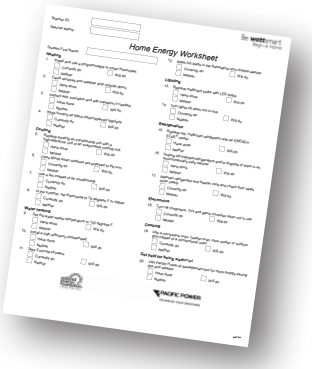
TABLE 3

	E	F	G
All CFLs		× $0.84	Annual cost of electricity with only CFLs
All LEDs		× $0.48	Annual cost of electricity with only LEDs

Cost figures are for an individual bulb (60 Watt incandescent), the lumens equivalent CFL (13 Watts) and LED (7 Watts) each used for 2 hours each day for 30 days. EEI Typical Bills and Rates Report, Winter 2018 (12 months ending 2017).

I have the *power* to be **watt**smart.

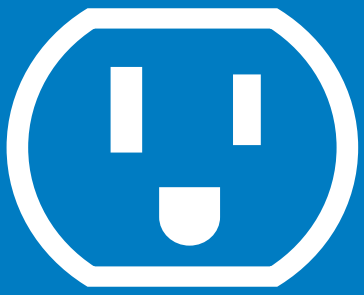
Together with your parent(s), complete the separate *Home Energy Worksheet*. Return the completed *Home Energy Worksheet* to your teacher or submit it online at hews@nef1.org to receive your wattsmart nightlight. You may find you are already practicing ways to be energy efficient but there is always room to do more.



Challenge yourself and your family to commit to practice energy efficiency by making wise energy choices and being wattsmart. You will not only help extend the life of our natural resources, but save money, too!

For other energy-saving ideas and incentives, visit **bewattsmart.com**. Congratulations to you and your family for making a difference.

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Be *watt*smart

Begin at home

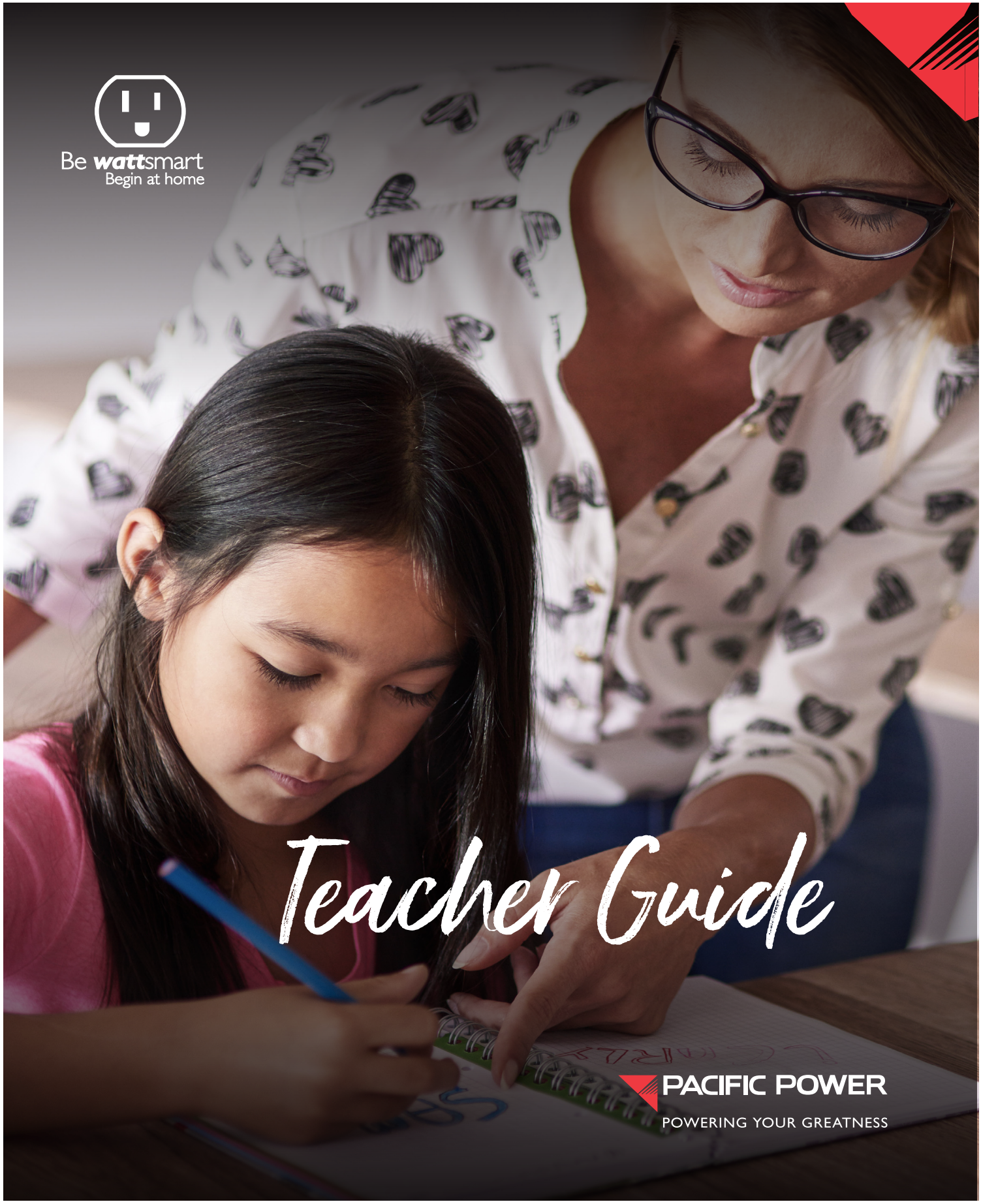
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Welcome to Be ***watts***mart, Begin at home

This program teaches the importance of energy and assists students and their families in saving energy in their homes. For teachers, Be ***watts***mart, Begin at home reinforces important electrical concepts from your curriculum.

This *Teacher Guide* was designed to supplement program instruction. A variety of tools have been provided to allow you to format Be ***watts***mart, Begin at home to meet your instructional needs. These tools include:

- General guidelines and activity suggestions
- Classroom activities to further the impact of lessons
- Additional fun and interesting activities for students
- Activities containing STEM-correlated curriculum for your classroom

About Pacific Power

Pacific Power is committed to the delivery of reliable electric service that's safe, low-cost and increasingly from clean, renewable resources. Serving more than 700,000 customers in Washington, Oregon and California, the company is one of the lowest cost energy producers in the nation.

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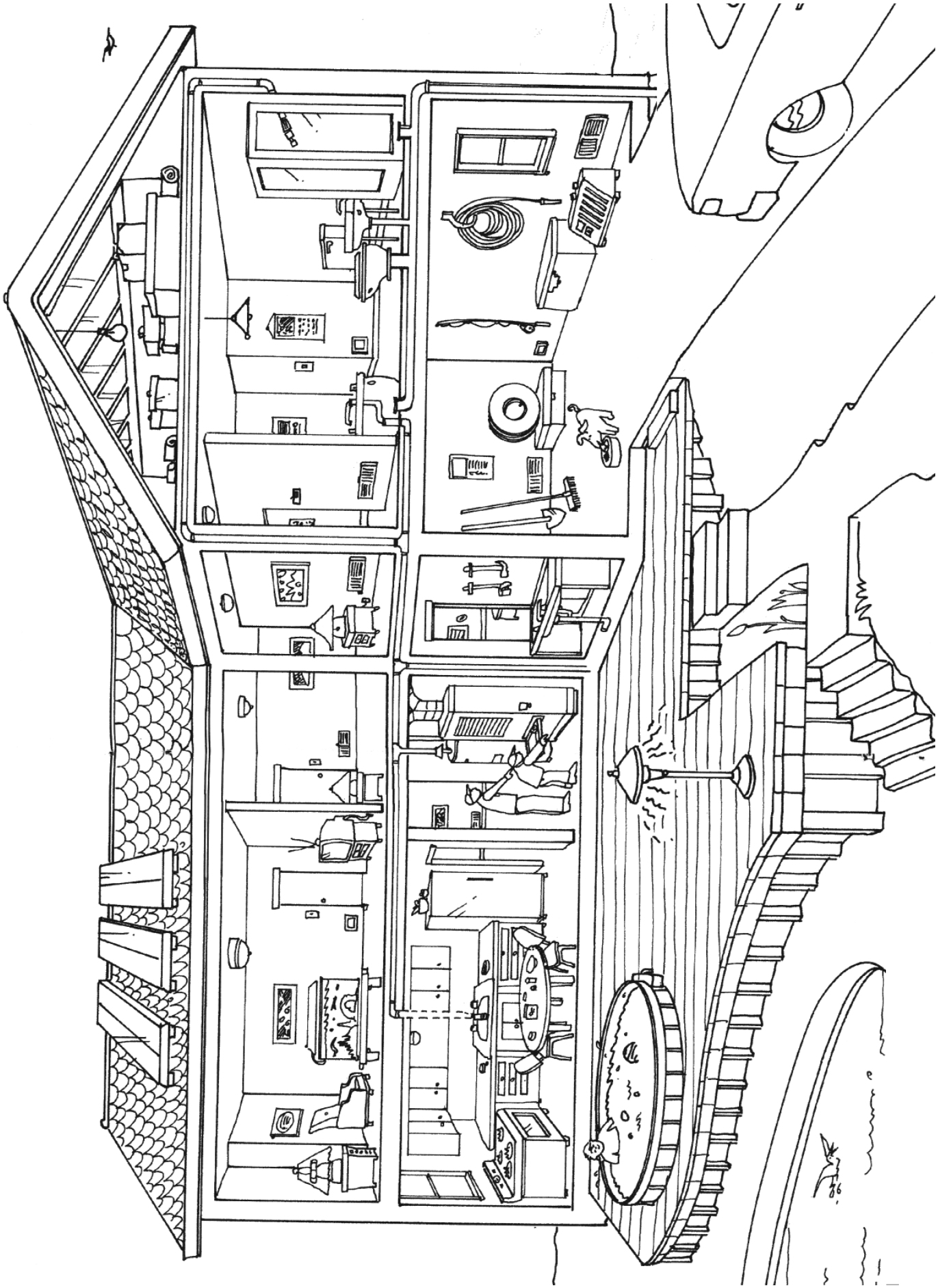
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STEM Connections

Activity	Science				Technology				Engineering					Math			
	Science as Inquiry	Energy Sources, Forms and Transformations	Science and Technology	Personal and Social Perspectives	Productivity Tools	Communication Tools	Research Tools	Problem-solving and Decision-making Tools	Historical Perspective	Design and Modeling	Invention and Innovation	Test Design and Troubleshooting	Use and Maintain	Numbers and Operations	Measurement	Data Analysis and Probability	Connection to the Real World
Pass the Sack		•		•													
The Search for Energy	•	•	•	•										•		•	•
A Bright Idea!	•	•	•	•	•	•	•	•	•	•	•	•	•				
The Art of Circuits	•	•	•					•		•	•	•					•
Shine a Light on History		•	•	•		•	•	•	•		•						
Layered Lunch	•		•							•							
How Do You Rate?	•	•		•		•	•					•	•		•		•
Energy in Math														•	•	•	•
Be wattsmart, Begin at home Poster		•		•			•	•									•

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Activity: Pass the Sack

Objective
Students will demonstrate the difference between renewable and nonrenewable resources and the need for conservation of resources.

Curriculum Focus
Science
Social Studies

Materials
- Two different kinds of candy or other objects students find desirable
- Sack to hold candy, such as a gallon size plastic bag

Key Vocabulary
Nonrenewable resource
Renewable resource

Next Generation Science Correlations
4-ETS1 – 2
4-ESS3 – 1-2
4-ESS3.A
5-ETS1 – 2
5-ETS1 – 1
5-ESS3 – 1
MS-ESS3 – 4
MS-ESS3.A

Introduction

Statistical research confirms world consumption of natural resources is increasing every year. Continued population growth ensures that demand for renewable and nonrenewable energy resources necessary to maintain our way of life will continue to increase. This creates problems for future availability of nonrenewable resources. Nonrenewable resources are just that, resources that cannot be renewed. For example, a resource used at our present rate might last about 100 years. Factor in population growth and increasing reliance on technology, and that resource may last only 79 years.

In this activity, two different types of candy (or other objects students would like) will represent resources. One type of candy will represent renewable resources and the other will represent nonrenewable resources.

Procedure

1. Before class, count out enough candy so there is one piece per student (some of each type of candy – less of one so it will run out faster). Put it in the sack or bag. Save the remaining candy. If you have a very polite class, count enough candy for half of the class. **You want the contents to run out before everyone gets candy!**
2. Tell students you will be demonstrating how resources get used over time by playing "Pass the Sack." Show students the sack and explain that when they get the sack, they should take some energy and pass the sack to the person next to them.
3. Before passing the sack to the first student, review renewable and nonrenewable resources. Have students give examples of each as you hand the sack to a student.
4. While this discussion is taking place, allow students to pass around the bag of candy without any rules about how many pieces students may take. Occasionally, add four or five pieces of **one** type of candy you are using, this will be your renewable resource. The sack will be empty before it reaches all the students.
5. Ask students who did not get any candy how they might obtain energy from other students. What if each student represented a country? How do countries obtain resources, trade, barter (trade for goods), buy (trade for currency), invade and take or go to war? What effect did the availability of candy have on relationships between students? What effect might the availability of natural resources have on the relationship among nations, provinces, states, people, standards of living and quality of life?

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6. Explain how our resources are like the candy. Which type was the nonrenewable? How could you tell? (No more was added to the bag once it was being passed around.) Which type was renewable? How could you tell? (It was added periodically to renew it.)

7. Point out that resources have limits just like the candy. Emphasize that many resources, such as fossil fuels, are nonrenewable and are being consumed faster than they are being replaced by nature. Discuss the fact that it would be more difficult for students to eat the candy if they had to search the room to find it instead of just taking it from the sack. Energy companies must seek resource deposits and obtain rights to drill or mine for them; they do not just magically appear.

8. Point out that renewable resources can also have limitations. They may not generate electricity as reliably as nonrenewable sources and the amount of energy produced may vary with weather and location.

9. Plan how to pass out the remaining candy.



Discussion

- Should rules be established to determine how the candy is distributed?
- Do oil, coal and natural gas companies have rules/regulations that must be followed to find resources?
- Should there be rules and regulations on how much oil, coal and natural gas people use?
- How do the class' social decisions influence the availability of candy?



To Know and Do More

Go to *eia.gov/kids* to access games, tips and facts for kids to learn about renewable energy and energy efficiency.

Discuss whether or not it is possible to run out of a renewable resource. Wood and fresh water are examples of renewable resources that can be used faster than nature can replace them.

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Activity: The Search for Energy

Objective

The student will learn the difference between renewable and nonrenewable resources.

Curriculum Focus

Math
Science
Social Studies

Materials

- 1/2 bag popcorn or other small item to represent solar energy
- Small pieces of ripped paper to represent approximate U.S. nonrenewable energy reserves
  - 164 black - coal
  - 22 red - uranium
  - 8 green - natural gas
  - 2 blue - oil
- Large sheet or tarp to place paper and popcorn on for easy clean up (optional)
- Copies of "Data Table and Graph"

Key Vocabulary

Nonrenewable resources
Renewable resources

Next Generation Science Correlations

4-ESS3-1
4-ESS3.A
5-ESS3 - 1
MS-PS1 - 2
MS-LS2 - 1
MS-ESS3.A

Introduction

Fossil fuels are extremely useful energy sources. Our society has adopted them because they can be readily available and economical. In the early part of the 20th century, a fledgling solar industry took root but was ultimately displaced by less expensive energy sources such as fossil fuels. Today some fossil fuels are harder to find and increasingly more costly. The sun, on the other hand, is just as plentiful as it was 100 years ago. It is a renewable resource that could become our most widely used source of energy.

The following activity is a simulation game in which students learn the difference between renewable and nonrenewable resources. The game reflects society's use and exhaustion of nonrenewable fuels and the eventual transition to renewable technologies.

Procedure

1. Divide the class into five equal groups. Each group will be a company going after a particular resource (coal, uranium, natural gas, oil or the sun). The paper and popcorn represent reserves of the various energy resources. Pass out copies of the student sheet "Data Table and Graph" to each group or have students create their own data tables on paper.
2. Have students gather in a large circle. Scatter the papers plus a handful of "solar" popcorn so they are well spread out in the center of the circle. You can do this on a sheet for easier clean up. Explain that this exercise demonstrates how the availability of resources changes over time. You may want to designate certain places as protected areas, where the resources are off limits to protect the environment.

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3. Tell students you will do several trials and look to see how the types of resources that are available change after each trial. Tell each group that they will have 30 seconds to pick up as many papers or popcorn as they can of their assigned type. Start timing.

   After 30 seconds have the groups stop and count the items they have gathered. Have each group announce their results to the class and record every count in their data table. If some groups have collected all of their available resource, point out that the resource is now depleted and they are unemployed.

4. Scatter another handful of "solar energy," helping students realize that since the sun is a renewable resource, there is the same amount of it each time you look, whereas the nonrenewable fuels are being depleted. Repeat the search period so students can get more papers or popcorn.

5. Stop after 30 seconds and have the group count and record the papers and popcorn collected again. Note that there are fewer nonrenewable fuels found in the second round. Students have to look harder to find what is left. The solar count is slowly catching up with the nonrenewable fuels. Repeat with additional trials as needed.

6. Have groups create a bar chart or, for more advanced students, a multi-line graph of the number of papers and popcorn collected each trial.



Discussion

- Why does the solar line differ from the others? Why does it go up rather than down?
- How do improvements in technology affect the extraction of resources from the earth?
- How do improvements in technology affect our usage of renewable resources?
- In the real world, can we extract ALL of a resource? Why do some deposits go unused?



To Know and Do More

Add wind and water to the activity. Lead a discussion to be sure the students understand why you continued adding more sun, wind and/or water after each trial, but did not add more of the other papers. As a class, come up with a general outline of how to more effectively manage the resources that are available to us.

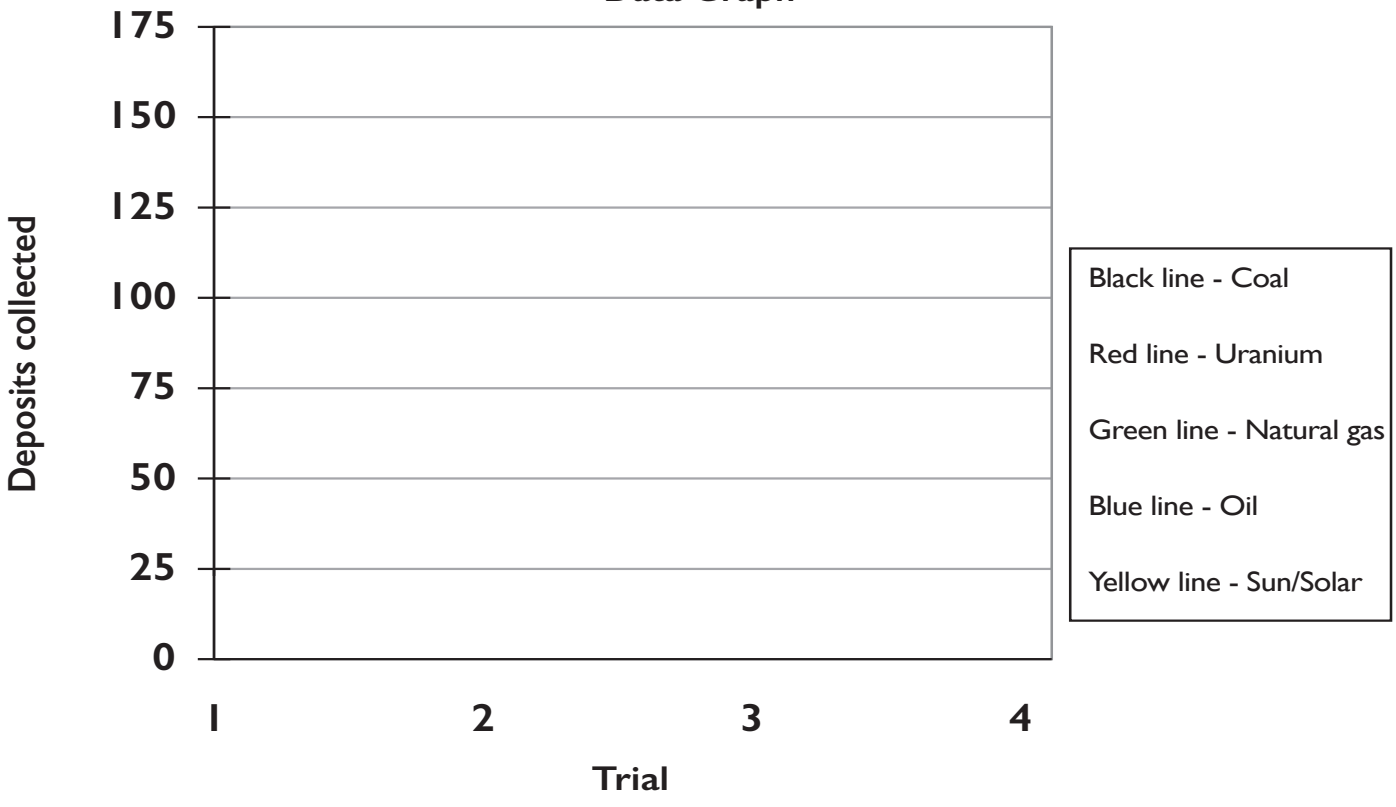
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Student Sheet: Data Table and Graph

Data Table

Search Period	Coal (Black)	Uranium (Red)	Natural Gas (Green)	Oil (Blue)	Sun/Solar (Popcorn)
1					
2					
3					
4					
Totals					

Data Graph



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Be *watt*smart
Begin at home

Activity: A Bright Idea!

Objective
Students will study an example of potential energy converted to energy in the forms of heat and light.

Curriculum Focus
Science

Materials
- Several general purpose C dry cell batteries
- A string of holiday lights, cut apart and stripped at the ends or small bulbs and sockets with wires
- Battery-operated toy and batteries
- Small flashlight bulbs and sockets
- Copies of "A Bright Idea!"

Key Vocabulary
chemical energy, circuit, closed circuit, current, electrode, electrolyte, kinetic energy, open circuit, parallel circuit, potential energy, radiant energy, series circuit, thermal energy, transformation, voltage

Next Generation Science Correlations
4-ETS1 – 1-2
4-PS3 – 2-4
4-ESS3 – 1
5-PS1.B
5-ESS3 – 1
5-ESS3.C
MS-PS3 – 3
MS-PS3.B
MS-LS2 – 1
MS-ESS3.A

Introduction

Alessandro Volta, an Italian physicist, made the first battery in 1795. Volta placed two different metal electrodes in an electrolyte solution (a chemical mixture which will conduct an electrical current). The chemical reaction caused an electromotive force. A common misconception is that batteries store electrical energy. This is not really true; batteries convert chemical energy to electrical energy. They store chemical energy that can be released during a chemical reaction. By using metals or carbons that have different chemical properties and an acid or base that will allow the movement of electrical charges, an electric current can be produced.

Procedure

1. Demonstrate a battery-operated toy with and without the battery. Explain that energy is the ability to do work or cause change, such as moving the toy or powering a light bulb.
2. Discuss:
   - How do we know the energy from the battery is working?
   - What kind of energy is the toy giving off? (possible answers include kinetic energy, mechanical, light, sound and heat)
   - The battery converts chemicals (chemical energy) to electricity (electrical energy) and the toy converts electricity to many possible forms of energy, including mechanical energy, heat (thermal energy), light and sound.
3. Have students use the materials provided to experiment with simple circuits by following the guided inquiry activity on the student sheet. As the students do the activity, have them note the light and heat energy given off.
4. Give students examples of types of potential and kinetic energy.

   Kinetic energy – a person riding a bike, a fire in a wood-burning stove, a person running

   Potential energy – a lump of coal, a sandwich, a rock at the top of a hill

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Discussion

Write the word choices on the board. Read the statements to the students and have them fill in the blanks using the words.

1. A battery converts chemical energy into _____ energy.
2. Electricity is a form of _____ energy.
3. The light bulb converts electrical energy into _____ and _____ energy.
4. A battery contains _____ energy.

Word choices:

potential electrical heat kinetic light

Answers:

1. electrical 2. kinetic 3. light, heat 4. potential

To Know and Do More

Ask students if they believe batteries are important to our way of life today. Have students make a list of all the items they used yesterday that contained a battery. Their list might include:

Wristwatch	Tablet
Automobile	Video game controller
Cell phone	TV remote control

To continue this, have students add to the list all of the items they can think of that use batteries. Are your students surprised at how many items today depend on batteries to operate and how many battery-operated items they depend on daily?

Career Awareness Activity

Search the internet for a company that produces batteries. Discover the various job opportunities and careers within that company. Your list might include: scientists, chemists, research analysts, accountants, purchasing agents and administrative assistants.

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Student Sheet: A Bright Idea!

Alessandro Volta, an Italian physicist, made the first battery in 1795. Volta put sheets of two different types of metal in a jar of water with a chemical that could carry electricity (an electrolyte). The chemical reaction between the electrolyte and the metal plates caused electrons to move when the plates were connected with a wire. The flow of electrons moving in a wire is called an electric current, or electricity.

Using one battery and one light, make the bulb light up. Congratulations, you have made an electrical circuit!

1. What did you have to do to get the light to come on and complete the circuit? How was it touching the battery?

2. What do you have to do to make the light bulb turn off and then back on?

3. What do you think the electrical terms "open circuit" and "closed circuit" mean?

4. How do you think a light switch works?

5. What type and form of energy is in the battery?

6. The battery's energy was transformed into what other forms of energy?

Using one battery, try to light up two lights.

1. Sketch how the wires are connected to the battery when you light two lights.

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2. Are the lights the same brightness as when you lit only one or are they dimmer?

3. A series circuit has only one path that electrons can follow as they are pushed from one side of the battery to the other. A parallel circuit has more than one path and the electrons can go more than one way to get from one end of the battery to the other. Which type of circuit did you make and draw?

4. Experiment with multiple batteries connected together, placing the positive end of one battery touching the negative end of another battery. What effect does the number of batteries have on the brightness of the bulbs?

5. If you leave the battery connected to a bulb long enough, you will feel the wire and the ends of the battery getting warm. What do you think is causing this?

6. Can that heat be useful? Can it be dangerous? Give an example to prove your point.

7. Wash your hands when you are finished.

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Activity: The Art of Circuits

Objective

The students will learn about conservation of energy and energy transfer by experimenting with electrical circuits.

Curriculum Connection

Science
Social Studies
Language Arts
Art

Materials

- Playdough® or homemade salt dough
- 9V batteries
- 9V battery clips with red and black cables
- 2V LED miniature light bulbs
- Insulating material - cardboard, packaging plastic or dough made from sugar, not salt (optional)

Key Vocabulary

Energy transfer
Electric current
LED (light-emitting diode)
Electric circuit
Insulator
Conductor

Next Generation Science Correlations

4-PS3 - 2
4-PS3 - 4
4-PS3.A-B, D
4-ETS1 - 1
4-ETS1.A
5-ETS1 - 1
5-ETS1.A
MS-PS3 - 3
MS-PS3.A-B
MS-ETS1 - 1
MS-ETS1.A

Introduction

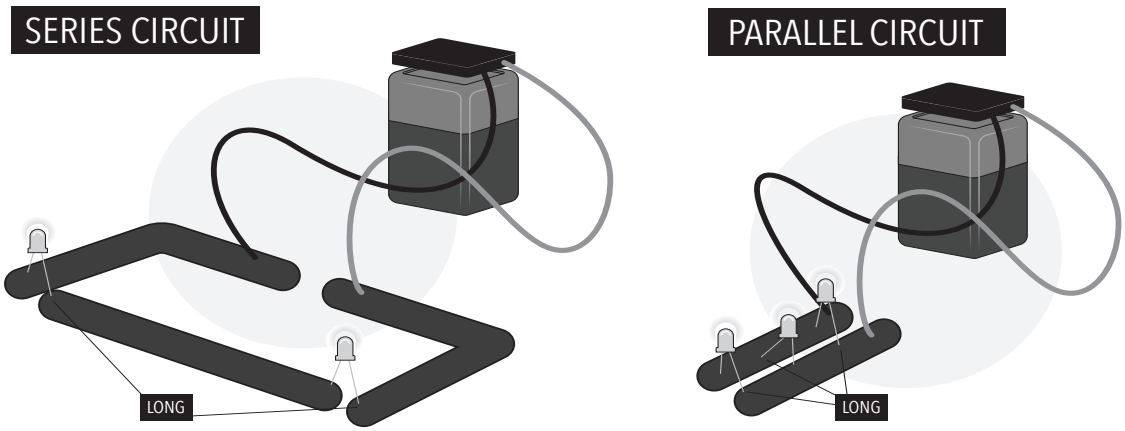
Materials that allow a flow of electric current to pass through them more easily are called conductors. Aluminum, silver, copper and water are examples. Insulators block the flow of electricity. Nonmetallic materials, such as rubber, plastic, wood, cloth and dry air are insulators. An electrical circuit is a path of conductors through which electric current flows. Energy can be transferred from place to place by electric current.

In this activity, students will use salt dough, which is a conductor, to design circuits which will transfer electrical energy. If they are successful, the electricity will be transformed to light and heat energy in a miniature LED bulb.

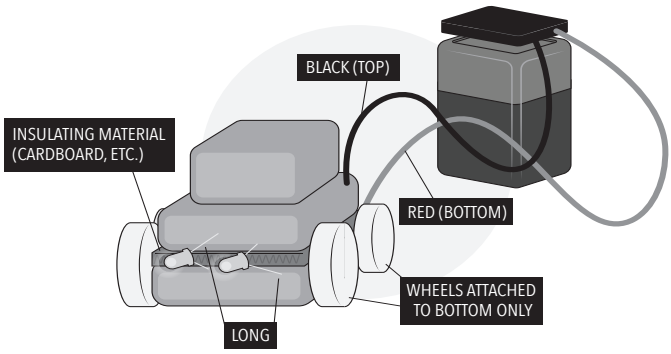
Procedure

1. Introduce students to their materials:
   a. Attach the battery to a battery clip with red and black cables. The red lead is the positive terminal and the black lead is the negative terminal.
   b. Examine the LED bulb. Two wires (or legs) extend from the bulb. The longer wire is the positive side of the LED and the short wire is the negative side. The LED should only be connected to dough, never directly to the battery terminals, which will cause the bulb to burn out.
2. Tell students that electricity can only go through the circuits they will create in one way. The positive terminal of the battery (red lead on battery clip) must be nearest a positive (long) leg of the LED. A battery pushes electricity around the circuit through the positive leg and out the negative (short) leg, then repeating through the next positive leg (if there is more than one LED in the circuit).
3. Explain that electricity will take the path of least resistance. It is easier for electricity to travel through the dough than through the LED, so if two pieces of dough are touching, the LED will not light.
4. Challenge students to design a simple circuit like the ones on the next page.

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If time allows, have students create a circuit work of art like the one below. Since the conductive dough cannot touch, use insulating material between layers.

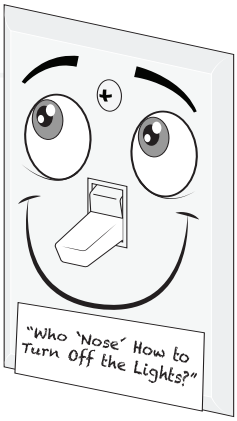


Discussion

- How does your dough circuit light the LED compared to the circuits at your home?
- In a series circuit with multiple LEDs, what happens to the brightness of the LEDs that are further from the battery? Why?

To Know and Do More

When a light switch is off, the electrical pathway to a bulb is not complete and electricity cannot flow to light that bulb. When you flip the switch on, you close the circuit and the light turns on. If light is not needed, it is important not to waste the natural resources used to generate the electrical power that is being transformed to light. Have students create characters without noses to put over light switches at school or home. The art should help remind them to turn lights off!



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Activity: Shine a Light on History

Objective

Students will gather details and make inferences from text to explain historical events related to electricity. They will use their knowledge to write information text to support an opinion.

Curriculum Focus

Language Arts
Social Studies
Science

Materials per student group

- Copies of "Edison v. Holonyak"

Key Vocabulary

LED (light-emitting diode)
Incandescent bulb
Filament
Electric meter
Inference
Persuasive
Lumen
Watt

Next Generation Science Correlations

4-PS3 - 2
4-PS3.A-B
MS-PS3 - 3

Introduction

Thomas Edison and Nick Holonyak are two famous lighting inventors. They both made major contributions that changed the way people lived. Thomas Edison patented the incandescent bulb in the late 1870s. Since that time, people have enjoyed the convenience of using electricity for light. Nick Holonyak created the first practical, visible-spectrum LED which revamped lighting as we know it.

In this activity, students will study the contributions of these two inventors. They will gather details to form an opinion about which man was more influential in history.

Procedure

1. Pass out copies of "Edison v. Holonyak" and have students read about each. If time allows, they can use the internet, or other sources, to find additional information.
2. Have students fill out the research cards for each inventor. Using that information, they should decide which inventor was more influential in history and write a persuasive paragraph, with details from their research to support their opinion.
3. Challenge students to practice reciting their paragraph and then present it to another student(s) in an attempt to change a differing opinion.

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Discussion

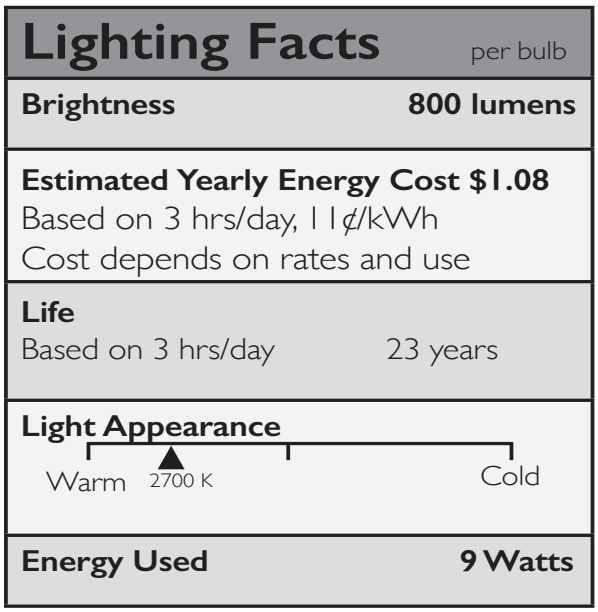
- What kinds of light bulbs are used in your home? How do they affect the way you live and work?
- What do you think the next great electrical invention will be?
- Thomas Edison said, "Genius is one percent inspiration and ninety-nine percent perspiration." What did he mean? How does his quote apply to you?

To Know and Do More

A light bulb package has a lighting facts label that contains different numbers.

- The light output in lumens.
- The power used by the bulbs, measured in Watts. The higher the wattage, the more energy the bulb uses.
- A measure of how warm or cool the light from that bulbs looks, measured in Kelvin (K). Low numbers are warmer light hues (orange or yellow). High numbers are cooler hues (blue or green).

When buying new bulbs, we should shop by lumens, not wattage. We save energy by finding bulbs with the lumens we need, then choosing the lowest wattage possible for that number of lumens.



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Activity: Layered Lunch

Objective

Students will understand that natural gas deposits are trapped and held by certain types of geologic formations.

Curriculum Focus

Science
Art

Materials

- Slices of bread
- Almond butter or other thick spread (e.g. cream cheese)
- Honey
- Plastic wrap or wax paper
- Plastic knife

Key Vocabulary

Permeable
Impermeable
Source rock

Next Generation Science Correlations

4-ETS1 - 1
4-ETS1.A
5-ETS1 - 1
5-ETS1.A
MS-LS4 - 1
MS-LS4.A
MS-ESS1 - 4
MS-ESS1.C
MS-ETS1 - 4
MS-ETS1.B

Introduction

How do we find natural gas? Try this activity to get an idea of the type of rock formations and characteristics geologists look for when locating natural gas deposits.

As natural gas molecules form, they migrate from shale "source rock" into more porous areas such as sandstone. Porous or permeable layers are much like a sponge with little pockets throughout the rock. The natural gas continues to move to either the earth's surface (where it escapes into the atmosphere) or it is trapped when nonporous or impermeable rock layers block its path.

Procedure

Using bread, almond butter and honey, create some edible models of rock layers.

1. Spread thick layers of almond butter then honey on a slice of bread. Top it with another slice of bread.
2. Make a second sandwich just like the first, or gently cut the sandwich in half.
3. Now put one sandwich (or one half) with the almond butter layer above the honey and the other sandwich (or other half) with the honey on top of the almond butter.
4. Next spread a thick layer of only honey on a slice of bread, adding another slice on top.
5. Cover your sandwiches with wax paper or plastic wrap and gently press down on them for about three seconds, representing millions of years of pressure.
6. Cut the sandwiches in half and observe what has happened.

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Discussion

1. What do you think the honey represents?

2. Which layer do you think represents porous rock?

3. Which layer is the nonporous rock?

4. Did the honey seep into both slices of bread? Why or why not?

5. What do you predict would happen with a sandwich made with only almond butter?

6. How might the ingredients you used affect your results?

7. Draw the layers of your sandwich and use colored pencils or crayons to distinguish the different layers and write labels for each layer that includes: impermeable, permeable, natural gas, nonporous rock and porous rock.

Answers

The honey represented natural gas or a fossil fuel. The bread was the porous rock where the honey or natural gas gets into the little pockets or air spaces. Almond butter acted like a nonporous rock layer blocking the honey from seeping into the slice of bread above the almond butter. The results may be different depending on your ingredients: denser bread – less seepage, creamier almond butter may be less impermeable or thicker honey may not fill the little pockets as easily.

To Know and Do More

Assign students to further investigate how natural gas is trapped in rock formations. Have them draw pictures of a formation and the trapping of oil and natural gas in the earth.

Visit a natural history museum and look for prehistoric life forms and rock formations.

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Activity: How Do You Rate?

Objective
Students will conduct a home survey to determine how they can use energy more efficiently by changing their habits and improving conditions and thereby improve the environment in which they live.

Curriculum Focus
Language Arts
Science
Social Studies

Materials
- Copies of "How Do You Rate?"

Key Vocabulary
Conservation
Efficiency
Environment
Natural resources
Quality of life

Next Generation Science Correlations
4-ESS3 – 1
5-ESS3 – 1
5-ESS3.C
MS-LS2 – 1
MS-ESS3 – 3
MS-ESS3.A

Introduction

We use natural resources every day. Sometimes we use them just as they come from earth or the atmosphere. At other times we alter their makeup to fit our needs. For instance, we use the sun just as it is to dry clothes, but we use photovoltaic cells to capture the sun's energy and convert it to electricity, a secondary energy source. We use coal just as it comes to us from the earth to make electricity, or we use coal to provide coke for steel manufacturing. Many natural resources we use every day are nonrenewable, once we use them they are gone; others are renewable, they can be replaced through natural and/or human processes.

It is responsible to use all resources efficiently and wisely. When we do, we reduce energy use, save money and preserve the environment. Making wise decisions today will have a positive impact on our future.

Imagine the difference we could make if we all used energy more efficiently. We would conserve natural resources for the future and enjoy better air quality and a better life. Each one of us can truly make a difference. All it takes is knowledge and action.

Procedure

Using energy efficiently and conserving our natural resources are responsible and easy actions that students can take today to show they respect the environment and have a desire to protect and preserve it.

1. Pass out "How Do You Rate?" Discuss the actions that may apply to the school (e.g., windows and doors have weather stripping; drapes or blinds are open on cold, sunny days and closed on hot days; thermostats are adjusted at night; lawns are only watered early or late in the day). As you discuss each action, write a T for true or F for false on the board to see how the school rates. What can the students do to improve energy use at school?
2. Decide on several actions the students can take at school to help save energy and protect the environment. One action might be to use both sides of their paper and then recycle. If a room is empty during lunch or at other times, they can be sure lights are turned off and computers are on sleep mode.
3. Have the students take the survey home and complete it with their parent's or guardian's help. Explain to students that it is important to record their true energy use and not mark what they think they should be doing.
4. How did the students' homes rate? Discuss the results of the home survey. Help students to become enthusiastic about conserving natural resources and using energy more efficiently.

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5. Prepare a graph to show the results of the energy efficiency survey. Which efficiency tips are already practiced by most students? Which were least used? Graph the number of students marking "yes" for each item.
6. Find the mean, median, mode and range of the data on the home survey.



Discussion

Discuss the benefits of energy conservation. How will our energy use impact our future? Compare the benefits and possible inconveniences and their correlation to our quality of life.



To Know and Do More

Why do you think people do not practice all of the energy efficiency tips on the survey? Are there false assumptions that affect people's behavior? (Believing that turning things on and off uses more energy than leaving them on, for example.)

Discuss how people in other geographic areas and cultures would rate. Does everyone have a car, dishwasher or an air conditioner?



Career Awareness Activity

Have the students think of some careers that could have a big impact on your community's energy usage. Some areas to consider: teachers — impact energy usage through education and by example; utility workers — through education and incentives; government regulators — through restrictions and rewards, such as financial benefits or tax breaks.

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Be wattsmart
Begin at home

Student Sheet: How Do You Rate?

How energy efficient is the building you live in? Together with your parents or guardians, answer the following questions to rate your home or apartment.

Circle T if the statement is true, F if the statement is false or NA if the statement does not apply to your living situation.

Heating and Cooling

Windows and doors have good weather stripping.	T	F	NA
Window coverings are open on cold, sunny days and closed on hot days.	T	F	NA
Window coverings are closed at night when heat is on.	T	F	NA
Thermostat is set at 68° F (20° C) or lower in winter.	T	F	NA
Air conditioning is set at 78° F (26° C) or higher in summer.	T	F	NA
Ducts are insulated in unheated/uncooled areas.	T	F	NA
Garage is insulated.	T	F	NA
Air filters on furnace and air conditioner are cleaned and changed regularly.	T	F	NA
Thermostat is adjusted at night.	T	F	NA
Fireplace damper is closed when fireplace is not in use.	T	F	NA

Water

A pitcher of water is kept in the refrigerator for drinking.	T	F	NA
Faucets and toilets do not leak.	T	F	NA
Showers and faucets are fitted with energy-efficient shower heads and aerators.	T	F	NA
Showers last no longer than 5 minutes.	T	F	NA
Toilets are low-flow, or tanks use water displacement devices.	T	F	NA
Hot water heater is set at 120° F (49° C). • If someone in your household has a compromised immune system, consult your physician.	T	F	NA
Hot water pipes from water heater are insulated.	T	F	NA
If located in an unheated area, hot water heater is wrapped in an insulation blanket.	T	F	NA
Broom, not hose, is used to clean driveways and sidewalks.	T	F	NA
Faucet is shut off while brushing teeth and shaving.	T	F	NA

Appliances

Dishwasher is usually run with a full load.	T	F	NA
Automatic air-dry is used with the dishwasher.	T	F	NA
Washing machine is usually run with a full load.	T	F	NA
Cold water is used in washing machine most of the time and is always used for rinses.	T	F	NA
Clothes dryer is usually run with a full load.	T	F	NA
Clothes are often hung up to dry.	T	F	NA
Refrigerator is set no lower than 37° F (3° C).	T	F	NA
Lids are usually put on pots when boiling water.	T	F	NA
Oven is preheated for only 10 minutes (if at all).	T	F	NA

Lighting

Lights are turned off when not in use.	T	F	NA
LED bulbs are used in at least one room.	T	F	NA
Security and decorative lighting is powered by solar energy.	T	F	NA
Light bulbs are kept dusted and clean.	T	F	NA
Sunlight is used whenever possible.	T	F	NA

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Trash

Glass, cans and newspapers are recycled.	T	F	NA	Over-packaged products are usually avoided.	T	F	NA
Plastic is separated and recycled.	T	F	NA	Reusable bags are used for groceries, or bags are recycled.	T	F	NA
Old clothes are often given to charities, second-hand clothing stores, etc.	T	F	NA	Rechargeable batteries are used when possible.	T	F	NA
Food scraps and organic waste are composted.	T	F	NA	Food is often bought in bulk.	T	F	NA
				Products made of recycled materials are favored.	T	F	NA

Transportation

Car is properly tuned and tires properly inflated.	T	F	NA	Public transportation is used when possible.	T	F	NA
Family drivers obey speed limit on the highway.	T	F	NA	Family members often walk or ride a bike for short trips.	T	F	NA
Family drives an electric vehicle	T	F	NA	Kids and parents carpool when possible.	T	F	NA

Environment

Trees and bushes are maintained for wildlife shelter and food.	T	F	NA	Bird feeders or bird houses are maintained.	T	F	NA
				Native plants are used to decrease water use.	T	F	NA

Yard and Workshop

Lawns are watered early or late in the day.	T	F	NA	Cutting edges on tools are kept sharp.	T	F	NA
Grass is mowed to a height of 2 to 3 inches (5 to 8 cm).	T	F	NA	Electrical tools are maintained and gas equipment is kept tuned and serviced.	T	F	NA
Hand tools, like pruners and clippers (rather than power tools) are used whenever possible.	T	F	NA				

Score 1 point for True, 0 points for False and 0 points for Not Applicable (NA).

Total Points: _____

Discuss the results of this survey with your family.
What can you and your family do to raise your score?

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Activity: Energy in Math

Objective
The students will interpret and evaluate numerical expressions as they solve word problems.

Materials
- Student Worksheet
- Individual White Boards (optional)

Key Vocabulary
Watt

Common Core Correlations
Numbers and Operations

Data Analysis and Probability

Connection to the Real World

Measurement

Introduction:

In this activity, students will complete the problem set found on the bottom of page 22 within an allotted time (10 minutes). Students will solve the mathematical problems making connections to real world situations.

Procedure:

1. Instruct students on the importance of learning to solve real world problems using their math skills. You may want to review some steps to solving word problems before beginning the first problem. The following questions might be useful to review:
   - Can you draw something to help you?
   - What can you draw?
   - What conclusions can you make from your drawing?
2. Pass out the worksheet.
3. Model the problem.

   Have a pair of students work at the board while the others work independently or in pairs at their seats.

   As students work, circulate. Reiterate the questions above. After several minutes, have the demonstrating students receive and respond to feedback and questions from their peers if necessary.
4. Calculate to solve and write a statement.

   Give everyone two minutes to finish work on that question, sharing their work and thinking with a peer. All should write their equations and statements of the answer.
5. Assess the solution for reasonableness.

   Give students one to two minutes to assess and explain the reasonableness of their solution.

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Discussion/Debrief

The student debrief is intended to invite reflection and active processing of the total lesson experience.

Invite students to review their solutions for the problem set. They should check work by comparing answers with a partner before going over answers as a class. Look for misconceptions or misunderstandings that can be addressed. Then guide students in a conversation to debrief the Problem Set and process the lesson.

Any combination of the questions below may be used to lead the discussion.

- What did you notice about this word problem?
- What is different in the problem?
- What are we trying to find out?
- How can we represent this part of the story? (draw, write a number, use manipulatives)
- What would help us organize our thinking and our work? (answers may vary: draw it out, act it out, write an equation, etc.)
- What strategies can we use to solve this problem?

To Know and Do More

Have your students turn in their worksheet showing their work to solve each problem. This will help you to assess your students' understanding of the math concepts presented in the lesson.

1. Jessie saved more energy than Michael. Michael saved more energy than Maggie. Maggie saved less energy than Jessie. Karen saved more energy than Jessie. List the kids' names in order of how much energy they saved, least to most:
   - Jessie, Karen, Maggie, Michael
   - Maggie, Michael, Jessie, Karen
   - Michael, Jessie, Maggie, Karen
   - Maggie, Karen, Michael, Jessie
2. The Maher family used 57,000 gallons of water a year, costing them $525 to heat it. Estimate how much money they would save in a year if they cut their hot water use by 30,820 gallons.
   - $100
   - $240
   - $284
   - $525
3. If each person in a house uses a 60-watt bulb in their bedroom 4 hours a day, and there are three people living there, how many Watts will be used a day to light their room?
   - 20 Watts
   - 240 Watts
   - 650 Watts
   - 720 Watts
4. For every 10 degrees the water heater setting is turned down, you can save 6% of the energy used. If Charles turns his water heater down by 15 degrees, about what percent savings in energy will he save?
   - 6%
   - 9%
   - 12%
   - 15%

Answers: 1. Maggie, Michael, Jessie, Karen; 2. $284; 3. 720 Watts; 4. 9%

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Be *watt*smart
Begin at h⌂me

Activity: Be *watt*smart, Begin at home Poster

Objective

The students will make their own energy- efficient choices that can be practiced at home to help future societies.

The students will also learn how they can be part of the solution to save energy and natural resources.

Materials

- House poster found on the following page
- Colored markers or pens

Key Vocabulary

Carbon Footprint
Recycle
Energy efficient

Common Core Correlations

Energy Sources, Forms and Transformation

Personal and Social Perspectives

Research Tools

Problem-solving and Decision-making Tools

Connection to the Real World

Introduction:

This is a fun project for students to create after they have studied energy, energy efficiency and renewable and nonrenewable resources. Using the poster given, students will add or color the items listed below to create a house that is eco-friendly and energy efficient. You can help your students answer questions about what types of energy they can use and how it will work in the house to create efficiency and save energy.

Procedure:

1. Add or color the items listed below. You may want to do different items each day as you cover different topics: electricity, natural gas, water, etc.
    - Add a bicycle.
    - Add recycling bins in the garage.
    - Add trees to shade the house.
    - Add a ceiling or floor fan to the home for cooling.
    - Put a blue star (for ENERGY STAR® products) on the refrigerator, television and furnace.
    - Color the energy-efficient showerhead.
    - Color all items that use electricity, yellow.
    - Color the thermostat, brown.
    - Color the furnace filter that is being changed, orange.
    - Draw a purple water drop next to all items in the house that use water.

To Know and Do More

- Have your students write a brief description of the things their family has done to improve energy efficiency at home. Have your students add any items that will encourage their families to be energy efficient in the future.
- Choose a natural resource used for energy and create a Venn diagram comparing the positive and negative effects of the use of this resource on the physical environment.

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Lingo Card

L	I	N	G	O
Water Heater	Natural Gas	Natural Resource	Incandescent	Reduce
Reuse	Phantom Load	Oil	Coal	ENERGY STAR®
Renewable	Energy	Be ***watt***smart Begin at home	Turn It Off	Uranium
Energy Efficiency	LED	Recycle	68 Degrees	Embodied Energy
Cooking	78 Degrees	Solar	Programmable or Smart Thermostat	Electricity

L	I	N	G	O
Reuse	Natural Gas	Phantom Load	LED	78 Degrees
Cooking	Electricity	Renewable	Recycle	68 Degrees
Natural Resource	Water Heater	Be ***watt***smart Begin at home	ENERGY STAR®	Nonrenewable
Embodied Energy	Coal	Energy Efficiency	Heating	Incandescent
Programmable or Smart Thermostat	Reduce	Oil	Solar	Uranium

L	I	N	G	O
Coal	Natural Gas	Solar	Turn It Off	Renewable
Water Heater	Nonrenewable	Phantom Load	Electricity	Reuse
Energy	Oil	Be ***watt***smart Begin at home	68 Degrees	Cooking
Programmable or Smart Thermostat	Incandescent	Recycle	Uranium	Natural Resource
Reduce	78 Degrees	Embodied Energy	LED	Energy Efficiency

L	I	N	G	O
Natural Resource	Water Heater	Natural Gas	Programmable or Smart Thermostat	78 Degrees
Turn It Off	Reduce	Oil	Embodied Energy	Cooking
Phantom Load	ENERGY STAR®	Be ***watt***smart Begin at home	Uranium	Recycle
Energy	LED	68 Degrees	Energy Efficiency	Heating
Electricity	Renewable	Incandescent	Reuse	Solar

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Dear Parents,

Today your child participated in the **Be wattsmart, Begin at home** program sponsored by Pacific Power. In this engaging presentation, your child learned key concepts of his or her science curriculum as well as important ways to be more efficient with energy use at home.

As part of the **Be wattsmart, Begin at home** program, your child received a:

- **Be wattsmart, Begin at home** booklet
- *Home Energy Worksheet*

Please take a moment to read through this informative booklet with your child. Then, fill out the *Home Energy Worksheet* in one of two ways:

- Visit *hew.nef1.org* and fill out an online worksheet. You will need to enter the teacher ID found on the paper worksheet.

  or

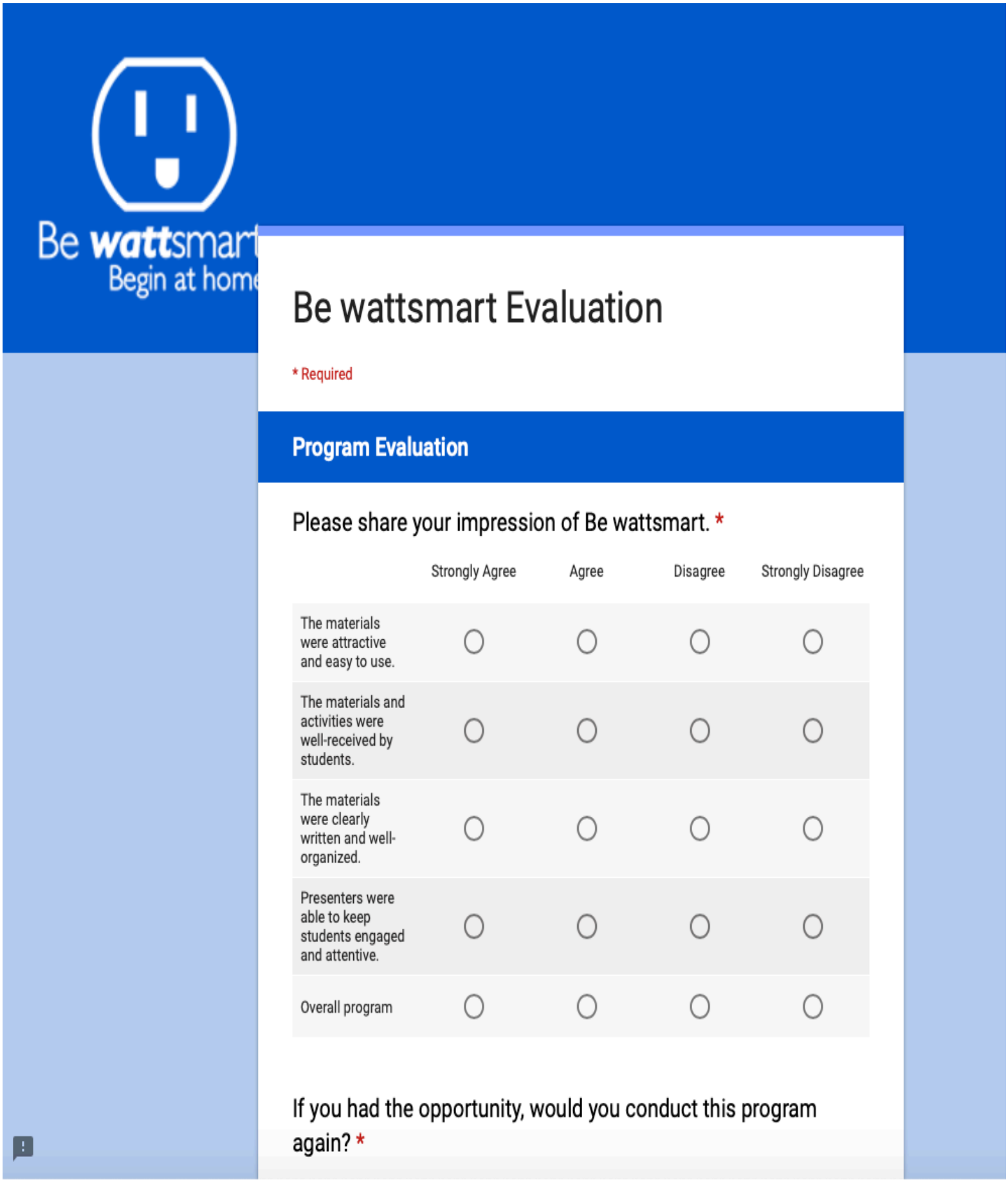
- Fill out the paper worksheet and return it to your child's teacher. To thank you, Pacific Power will provide your child with a wattsmart nightlight.

We appreciate your efforts to reinforce important **Be wattsmart, Begin at home** energy knowledge and efficiency actions in your home!

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*Watt*smart **Pacific Power program**

Program Evaluation Summary

Educators' impressions of the program from 23 educators.

	Strongly Agree	Agree	Disagree	Strongly Disagree	
Materials were attractive and easy to use.	16	7	0	0	70% 30%
Materials and activities were well received by students.	17	6	0	0	74% 26%
Materials were clearly written and well organized.	19	4	0	0	83% 17%
Presenters were able to keep students engaged and attentive.	19	3	1	0	83% 13% 4%
Overall program	20	3	0	0	87% 13%

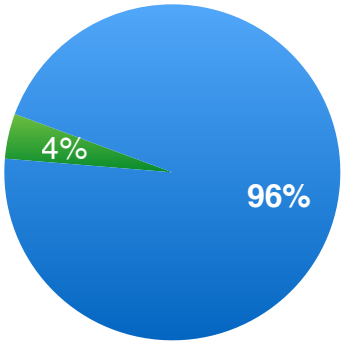
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*Watt*smart **Pacific Power program**

Program Evaluation Summary

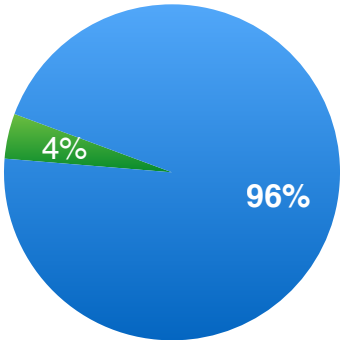
If you had the opportunity, would you conduct this program again?

	Yes	No
Mini-grant	22	1



Would you recommend this program to other colleagues?

	Yes	No
Mini-grant	22	1



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In my opinion, the thing the students liked best about the materials/program was:
Active participation
All parts
I think the kids really liked the videos that were presented to them.
I think they liked watching the video of the girl.(sorry I can't remember her name)
Lingo and the interaction with the presenters
Lingo cards
LINGO, circuit stick, videos
Lingo, engaging, the nightlight reward
Presentation and night light
Students like getting the nightlight and then the mini-grant for special classroom supplies.
The demonstrations of current using the light up bar. Also the Lingo.
The hands on activities.
the hands on presentation
The hands-on activities
The position of the presentation when students go to volunteer.
The presentation of the transfer of energy and Lingo
The presenters were excellent
The videos at the end of the presentation.
They love playing Lingo and they love the light stick demo.
They loved participating either by helping with demonstrations or playing Lingo, and also liked watching the video.
when they demonstrated how electricity works.

In the future, one thing I would change would be:

an extra night light, a new student started that day, she attended watt smart but not enough night lights, one short
Give students more of an opportunity to be engaged (more time) for LINGO.
giving a little LINGO reward to the LINGO winners.
I still haven't received my night lights for the surveys being returned.
I think more should be done with the lingo cards, if we use them.
N/A I love this presentation and wouldn't change a thing.
Nothing - We loved the new videos and materials that you provided
Nothing- I love your presenters and the presentation!
nothing, it was awesome as usual
Presentation Format, needs to be more engaging
The new girl in the videos is so far "out there," that kids weren't really listening to her but more reacting like "I can't believe she said that." I don't mind the girl herself. I think what would be most effective is the girl slightly livening up Lineman Slim's old videos. She's just a little too goofy.
They liked the hands on stuff
To schedule a solid 1 hour block of time and not 45 minutes.
We were a bit rushed due to our homeroom schedule this year. Still, the presenters did a great job of making the program work in the abbreviated time.

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Be ***watt***smart
Begin at h⌂me

Teacher ID: _____

Teacher Name: _____

Home Energy Worksheet

Student First Name: _____

Heating

1. Install and use a programmable or smart thermostat.
   ☐ Currently do ☐ Will do ☐ Neither
2. Caulk windows and weather strip outside doors.
   ☐ Have done ☐ Will do ☐ Neither
3. Inspect attic insulation and add insulation if needed.
   ☐ Have done ☐ Will do ☐ Neither
4. Keep furnace air filters clean/replaced regularly.
   ☐ Currently do ☐ Will do ☐ Neither

Cooling

5. Replace existing air conditioning unit with a high-efficiency unit or an evaporative cooling unit.
   ☐ Have done ☐ Will do ☐ Neither
6. Close blinds when windows are exposed to the sun.
   ☐ Currently do ☐ Will do ☐ Neither
7. Use a fan instead of air conditioning.
   ☐ Currently do ☐ Will do ☐ Neither
8. In the summer, set thermostat to 78 degrees F or higher.
   ☐ Currently do ☐ Will do ☐ Neither

Water heating

9. Set the water heater temperature to 120 degrees F.
   ☐ Have done ☐ Will do ☐ Neither
10. Install a high-efficiency showerhead.
    ☐ Have done ☐ Will do ☐ Neither
11. Take 5 minute showers.
    ☐ Currently do ☐ Will do ☐ Neither
12. Wash full loads in the dishwasher and clothes washer.
    ☐ Currently do ☐ Will do ☐ Neither

Lighting

13. Replace inefficient bulbs with LED bulbs.
    ☐ Have done ☐ Will do ☐ Neither
14. Turn lights off when not in use.
    ☐ Currently do ☐ Will do ☐ Neither

Refrigeration

15. Replace old, inefficient refrigerator with an ENERGY STAR® model.
    ☐ Have done ☐ Will do ☐ Neither
16. Unplug old freezers/refrigerators and/or dispose of them in an environmentally safe manner.
    ☐ Have done ☐ Will do ☐ Neither
17. Maintain refrigerator and freezer coils and check door seals twice yearly.
    ☐ Currently do ☐ Will do ☐ Neither

Electronics

18. Turn off computers, TVs and game consoles when not in use.
    ☐ Currently do ☐ Will do ☐ Neither

Cooking

19. Use a microwave oven, toaster oven, slow cooker or outdoor grill instead of a conventional oven.
    ☐ Currently do ☐ Will do ☐ Neither

Get paid for being *watt*smart

20. Visit Pacific Power at *bewattsmart.com* for more energy-saving tips and rebates.
    ☐ Have done ☐ Will do ☐ Neither

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WAT WA

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Home Energy Worksheet (Spanish)

Ser *watt*smart
Empieza en casa

Identificación del profesor(a): _____

Nombre del profesor(a): _____

Verificación de Energía Doméstica

Primer nombre del estudiante: _____

Calefacción

1. Instalar y usar un termostato programable o termostato inteligente.
   ☐ Lo hago ☐ Lo haré ☐ Ninguno
2. Calafatear ventanas e instalar burletes en el exterior de las puertas.
   ☐ Lo he hecho ☐ Lo haré ☐ Ninguno
3. Inspeccionar el aislamiento del ático y agregar aislamiento si es necesario.
   ☐ Lo he hecho ☐ Lo haré ☐ Ninguno
4. Mantener los filtros de aire de la calefacción limpios/reemplezarlos regularmente.
   ☐ Lo hago ☐ Lo haré ☐ Ninguno

Enfriamiento

5. Reemplazar la unidad de aire acondicionado existente por una unidad de alta eficiencia o un enfriador evaporativo.
   ☐ Lo he hecho ☐ Lo haré ☐ Ninguno
6. Cerrar las persianas cuando las ventanas están expuestas al sol.
   ☐ Lo hago ☐ Lo haré ☐ Ninguno
7. Usar un ventilador en lugar del aire acondicionado.
   ☐ Lo hago ☐ Lo haré ☐ Ninguno
8. En el verano, ajustar el termostato a 78 grados F o más.
   ☐ Lo hago ☐ Lo haré ☐ Ninguno

Calentadores de agua

9. Programar el calentador de agua a 120 grados F.
   ☐ Lo he hecho ☐ Lo haré ☐ Ninguno
10. Instalar un cabezal de ducha de alta eficiencia.
    ☐ Lo he hecho ☐ Lo haré ☐ Ninguno
11. Tomar duchas de 5 minutos.
    ☐ Lo hago ☐ Lo haré ☐ Ninguno
12. Lavar cargas llenas en los lavaplatos y las lavadoras de ropa.
    ☐ Lo hago ☐ Lo haré ☐ Ninguno

Iluminación

13. Reemplazar los focos ineficientes con focos LED.
    ☐ Lo he hecho ☐ Lo haré ☐ Ninguno
14. Apagar las luces cuando no estén en uso.
    ☐ Lo hago ☐ Lo haré ☐ Ninguno

Refrigerador

15. Reemplazar refrigerador antiguo e ineficiente con un modelo de ENERGY STAR®.
    ☐ Lo he hecho ☐ Lo haré ☐ Ninguno
16. Desenchufar refrigeradores/congeladores viejos y/o desecharlos de una manera ambientalmente segura.
    ☐ Lo he hecho ☐ Lo haré ☐ Ninguno
17. Mantener las bobinas del refrigerador y del congelador e inspeccionar el sello de las puertas dos veces al año.
    ☐ Lo hago ☐ Lo hago ☐ Ninguno

Electrónicos

18. Apagar computadoras, televisores y consolas de juegos cuando no estén en uso.
    ☐ Lo hago ☐ Lo haré ☐ Ninguno

Cocinar

19. Usar un horno microonda, un horno eléctrico, un olla de cocimiento lento o un parrilla de aire libre en lugar del horno convencional.
    ☐ Lo hago ☐ Lo haré ☐ Ninguno

Reciba paga siendo *watt*smart

20. Visite Pacific Power en bewattsmart.com para obtener más consejos y rebajas de ahorro de energía.
    ☐ Lo he hecho ☐ Lo haré ☐ Ninguno

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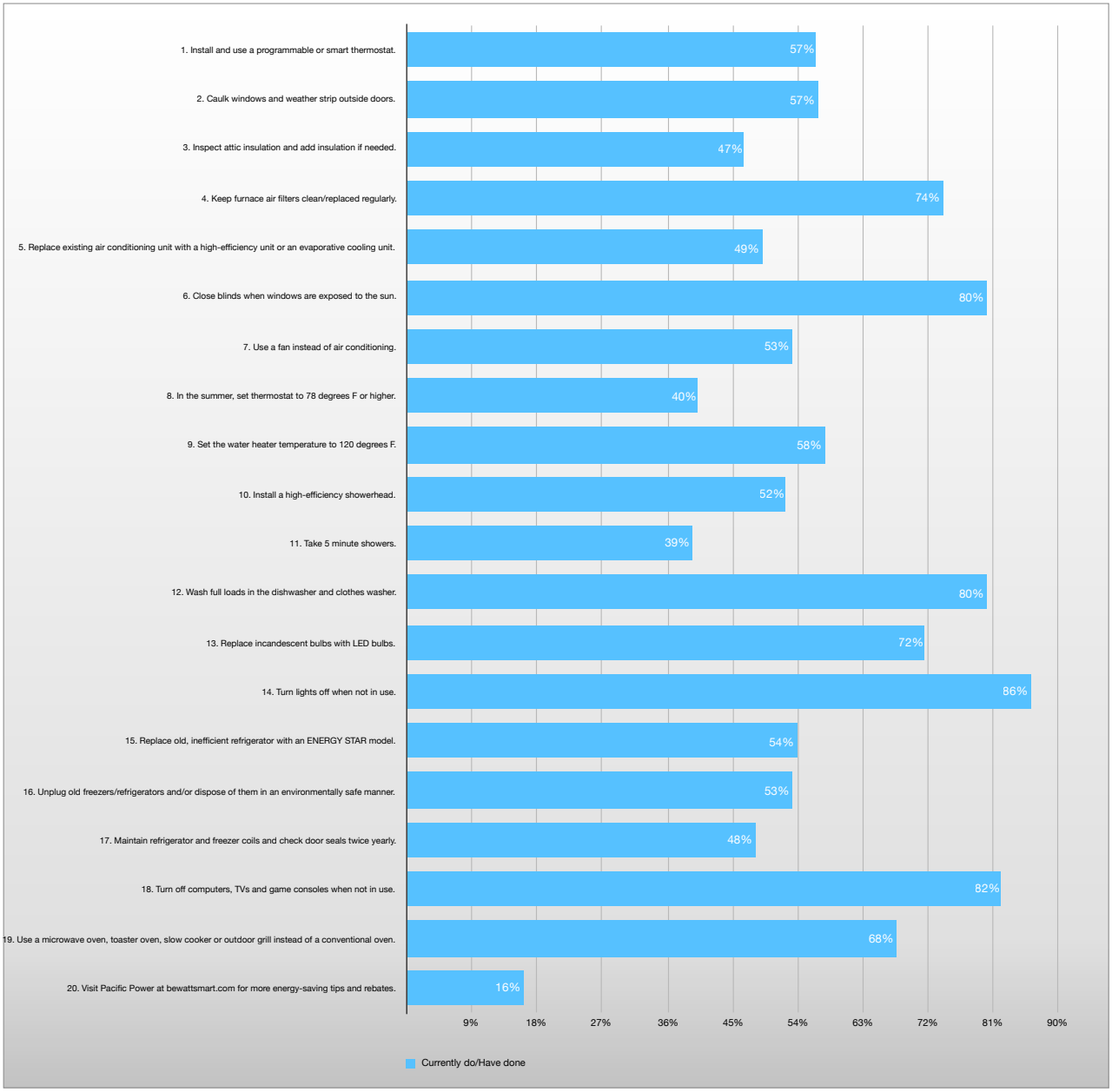
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Home Energy Worksheet Summary – Pacific Power

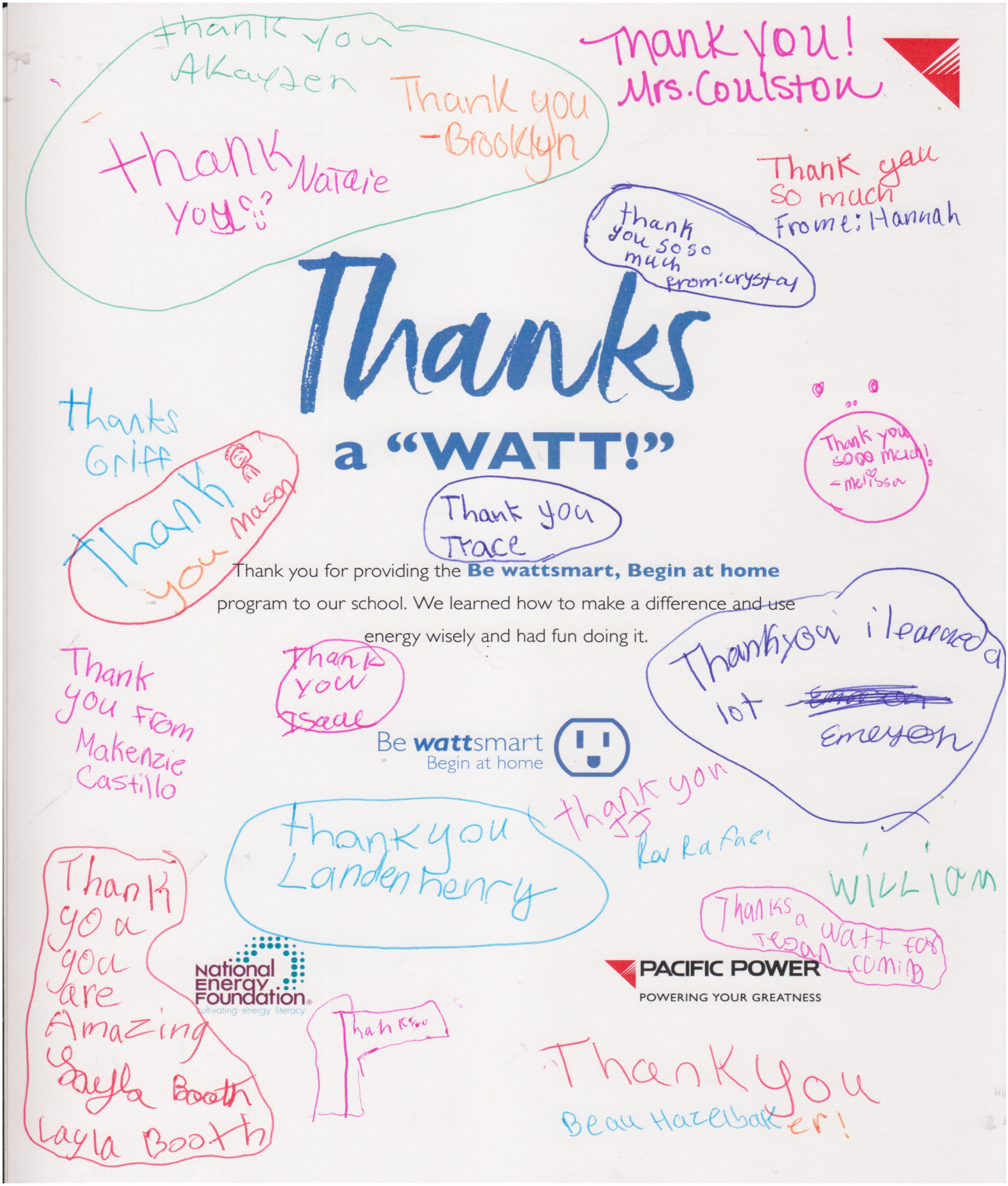
Energy Efficient Activity	Currently do/Have done	Will do	Neither
1. Install and use a programmable or smart thermostat.	57%	18%	25%
2. Caulk windows and weather strip outside doors.	57%	23%	20%
3. Inspect attic insulation and add insulation if needed.	47%	21%	32%
4. Keep furnace air filters clean/replaced regularly.	74%	15%	11%
5. Replace existing air conditioning unit with a high-efficiency unit or an evaporative cooling unit.	49%	20%	30%
6. Close blinds when windows are exposed to the sun.	80%	12%	8%
7. Use a fan instead of air conditioning.	53%	20%	27%
8. In the summer, set thermostat to 78 degrees F or higher.	40%	23%	37%
9. Set the water heater temperature to 120 degrees F.	58%	20%	22%
10. Install a high-efficiency showerhead.	52%	23%	24%
11. Take 5 minute showers.	39%	28%	32%
12. Wash full loads in the dishwasher and clothes washer.	80%	8%	12%
13. Replace incandescent bulbs with LED bulbs.	72%	19%	9%
14. Turn lights off when not in use.	86%	11%	2%
15. Replace old, inefficient refrigerator with an ENERGY STAR model.	54%	24%	23%
16. Unplug old freezers/refrigerators and/or dispose of them in an environmentally safe manner.	53%	20%	27%
17. Maintain refrigerator and freezer coils and check door seals twice yearly.	48%	34%	18%
18. Turn off computers, TVs and game consoles when not in use.	82%	13%	5%
19. Use a microwave oven, toaster oven, slow cooker or outdoor grill instead of a conventional oven.	68%	17%	15%
20. Visit Pacific Power at bewattsmart.com for more energy-saving tips and rebates.	16%	65%	19%

Wise Energy Behaviors in Pacific Power Washington Homes



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Sampling of *Thanks a "WATT" Cards*



We learned so much about how we can use electricity responsibly!
-Mrs. Kangas

Emmanuel

Alfredo

Alina

angel

Martin

Jackie

Thanks a "WATT!"

Hanjas

Brooklyn

Aloé

Graven

Kloell

Jandro

Thank you for providing the **Be wattsmart, Begin at home** program to our school. We learned how to make a difference and use energy wisely and had fun doing it.

Bruseda

Meah

Brianna

Donatin

mackenzie

Be wattsmart Begin at home

Bradley

Lallanie Mc

ariella

Natalee

Destiney

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Zakahi

Ricardo

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Thank you so much for continuing to offer such a fun, engaging, and informative presentation! My students loved the presentation and Mr. and Mrs. Smith! They did a fantastic job!

-Hailey McCaffrey

Thanks a "WATT!"

Anthoy Alfredo Carlos

Thank you for providing the **Be wattsmart, Begin at home** program to our school. We learned how to make a difference and use energy wisely and had fun doing it.

Amy Lizet Benjamin Ariana Yosgalt Miley Francisco Munguia Jesus Roxy Jonathan Quijada Maria Emely Lozano

Be wattsmart Begin at home

YOS Mrs. McCaffrey's Class

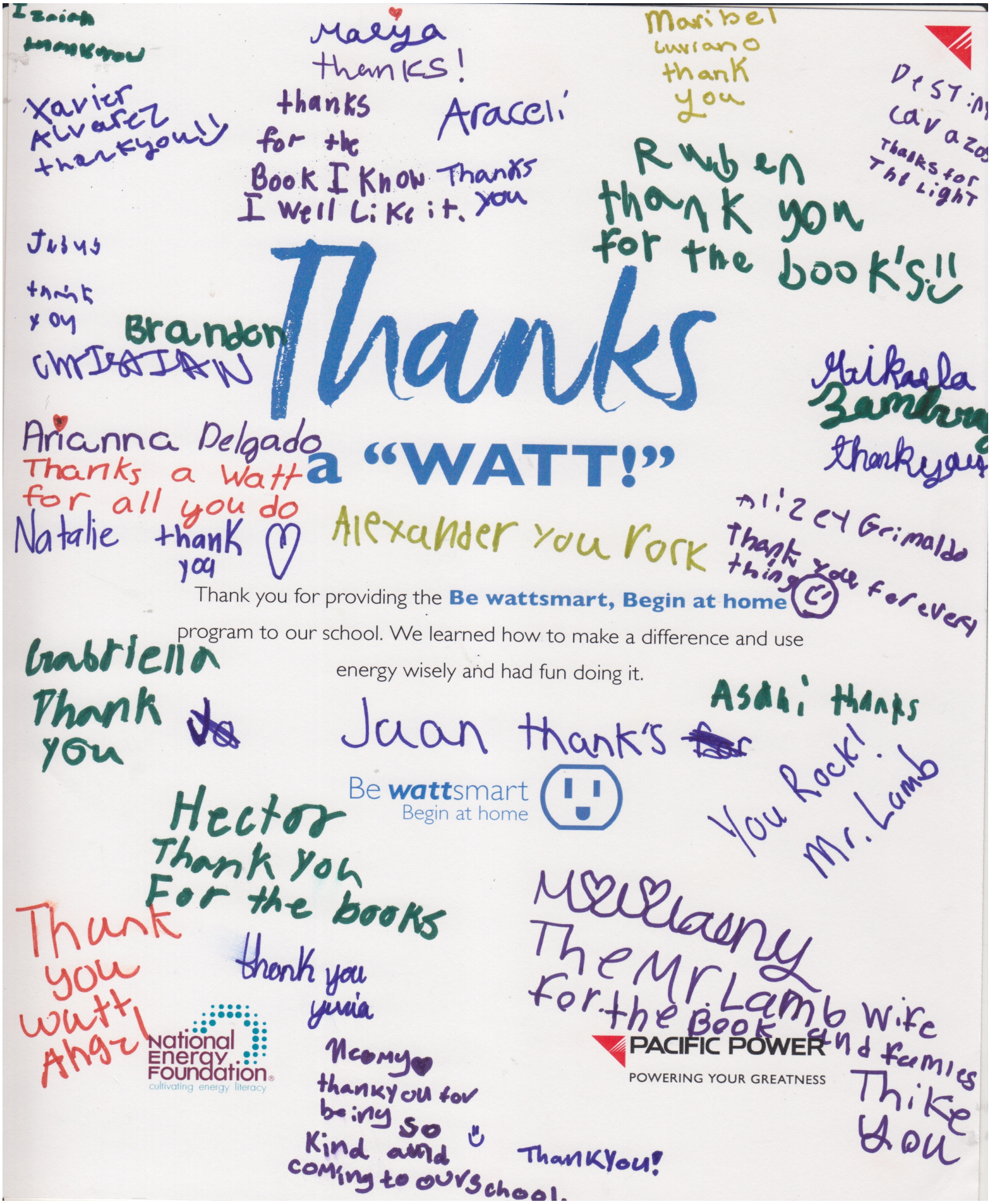
Adams Elementary Zitlaly

Ismael Alexsair Jose ~~Mata~~ Brayan Brisia Victor Joshua Jazmine Sofi Dayana Flores Keyri

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Renee

Monserrat thanks!

Willem

Daemon

it chang my life! - Tomas

thankyou Brandon!!

Omar thank you

Blake G. thank you for your time!

Thank you so much for taking time off your day to do the presentation! - Mace

Thanks a "WATT!"

Addison Thank you!

thankyou for taking your time to talk to us. - Bianca

Ryan

Guido

thanks

Thank you so much! Always enjoyable. Mrs. Strother

Adrianna thank you for your time

Thank you for providing the **Be wattsmart, Begin at home** program to our school. We learned how to make a difference and use energy wisely and had fun doing it.

Melia thank you for your time!

Be wattsmart Begin at home

Vihey

Frances thank you!

Tierra Thank you for your time. It Changed my life!

James thank you!!

Jasmin thank you!

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Alivia

Kiara Thank you.

thank you

Brayden thankyou

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Appendix 6
Washington Program Evaluations

Washington 2018 Evaluations

Program Evaluation Recommendations and Company Responses

Evaluation reports provide detailed information on the process and impact evaluations performed on each program, summarizing the methodology used to calculate the evaluated savings as well as providing recommendations for the Company to consider for improving the process or impact of the program, as well as customer satisfaction.

Outlined below is a list of the programs, the years that were evaluated during 2018 and the third party evaluator who completed the evaluation. Program evaluations are available for review at www.pacificorp.com/es/dsm/washington.html

Program	Years Evaluated	Evaluator
Low Income Weatherization	2013 - 2015	Opinion Dynamics
Home Energy Reports	2016 - 2017	ADM
*watt*smart Business	2016 - 2017	Cadmus

Company responses to the program recommendations contained in the evaluations are provided below.

Table 1
Low Income Weatherization Evaluation Recommendations

Evaluation Recommendations	Pacific Power Response
Pacific Power should continue to use the same Program implementers moving forward.	Continuing to partner with Blue Mountain Action Council, NW Community Action Center and Opportunities Industrialization Center of Washington. And, obtained additional agreement with Yakama Tribal Nation in mid-2018.
If it is a priority for Pacific Power to make sure it is recognized for its sponsorship of the Program, consider branding the agency staff who conduct the audits and installation services by wearing shirts with the Pacific Power name and logo.	Discussed logo shirts with legal staff, but not moving forward with this due to liability issues. The company would not have enough control over agency staff to be able to grant a license for them to use the Pacific Power logo.
Pacific Power take a historical look at participation amongst its low income population that likely has electric heat to determine how much of the market has been penetrated thus far. This exercise could also help to identify and target households that have not participated yet.	Over 7,700 homes have been served through the program to-date. We estimate that at least 90% or about 7,000 have installed electric heat. We don't ask for or store customer income data. We track energy assistance payments which are income based. A total of 6,980 households were identified as energy assistance recipients in 2018. We work with our partnering agencies and provide lists of energy assistance recipients with high kWh usage if requested.
Inquire with the implementing agencies, particularly with BMAC, to assess whether they need assistance in providing training for QCIs or auditors to ease the added costs of regulatory compliance.	Discussed with BMAC staff. They don't know how Pacific Power can assist with their QCI issues. Their concern is with the related requirements implemented by the WA State Commerce Department. For example, an employee that is a QCI inspector cannot fulfill other program tasks and so in smaller agencies this is a staffing issue.
Explore this innovating financing tariff (contained in appendix B of this report) that allowed a utility to address both structural and energy improvements through its low income weatherization program at no cost to the participant.	The program tariff allows Pacific Power to cover up to 15% of measure costs on home repairs. In CY2018 the agency billings included 4.4% related to repairs. They could have billed an additional $80,000 to cover these costs, but they have other grants that can pay for repairs. Additionally, there is no funding cap on this program. Because of these factors it has been determined that a financing tariff would not improve upon the program.

Table 2
Home Energy Reports Evaluation Recommendations

Evaluation Recommendations	Pacific Power Action Plan
Consider developing strategies to modify the control group to better-align with the treatment group on an annual or monthly basis. This may include "refilling" the control group with new households or removing control group households to create a new match. Selection of control group replacements at various points during the program, such as at the end of the end of the Legacy and Expansion waves, will help test validity. Such replacements can be chosen using propensity score matching, based on historic kWh usage.	Pacific Power and Bidgely are advocating against a refill of control group at this time for the following reasons. First, this was a recommendation to remediate declining statistical equivalence of the Legacy wave; however, on current inspection, we see that the Legacy treatment and control groups are still statistically equivalent in the pretreatment period. Second, adding users to just the control group may bias the results and create additional overhead in program administration in management of these groups. Moreover, Pacific Power and Bidgely are exploring re-randomizing and creating new treatment and control groups for the program year 2021 onwards, so taking steps to further prolong statistical equivalence is not critical at this juncture.
Where possible, tailor program recommendations to demographics. The Refill wave skews younger, with a lower homeownership rate and with 20% of respondents indicating an income less than $25,000 per year. Program materials sent to this wave should have messaging focused on tips more appropriate for renters and lower income households (e.g., focusing information on low-cost or no-cost efficiency options, rather than on higher -cost appliances).	The home energy reports and the web portal already incorporate a library of tips focused on low cost / no cost efficiency options that customers can easily implement. Examples include adjusting thermostat settings, cleaning of vents or appliance usage tips.
Consider cross-referencing treatment customers with known low income screening tools (such as Low Income Home Energy Assistance Program (LIHEAP) registration) to spur outreach for Pacific Power low income programs. These groups are to some extent pre-engaged with *watts*mart via the home energy report and could be targeted for appropriate income qualified programs.	As explained in response to No. 2, the home energy reports already promote low cost / no cost efficiency options that will be beneficial for any low income recipients receiving the reports for customers; with that said, Pacific Power and the vendor are exploring if any of the home energy report recipients are part of the Washington Low Income Bill Assistance (LIBA) program and if the current data feeds to the vendor have the ability to detect these customers. If so, the team will work on a strategy to try and promote low income programs to this population.

Table 3
*watt*smart Business Evaluation Recommendations

Evaluation Recommendations	Pacific Power Response
Savings: Increase the deemed savings for prescriptive HVAC Variable Frequency Drive (VFD) fan and pump motor projects. To match Cadmus' 2016 Variable Speed Drive Loadshape Project report. Supply Fan Motor - 2,033 kWh/yr/HP Return Fan Motor - 1,788 kWh/yr/HP Exhaust Fan Motor - 1,788 kWh/yr/HP	This recommendation has been reviewed and here is outcome of the review. The Company is required to use Regional Technical Forum (RTF) unit energy savings values where available (or explain why not). RTF has not published deemed values for VFDs applied to HVAC fan and pump motors; however the RTF's Advanced Rooftop Unit Control measure contains analysis that is applicable. Fan motor VFDs savings are being revised based on the HVAC VFD fan portion of the RTF analysis of the advanced rooftop unit controls unit energy savings measure where data for VFDs applied to fan motors could be separated from other advanced rooftop unit component savings.
Marketing: Consider the following opportunities and incorporate those that can be done cost effectively.	Due to cost-effectiveness considerations, some (but not all) of the recommendations can be implemented. See the responses below for each item.
Re-institute the Energy Insights newsletter or identify a similar vehicle to distribute case studies	The Company does not have plans to re-institute the Energy Insights newsletter at this time. Case study videos are in development in 2019 and will be hosted online and distributed via email with links to the videos.
Provide links in print ads, directing customers to case studies or other sources of more detailed information	The Company will take this recommendation under advisement.
Use images within the text of the program brochure to convey information visually as well as through text.	The Company will take this recommendation under advisement.
Format eblasts consistently to ensure customers identify them all with the program	Implemented. In 2018, the company launched a new brand look/feel. Our emails are deployed in templates to align with brand for consistency.
Issue eblasts throughout the year, concurrent with program changes.	We will take this recommendation under consideration.
Update case studies from 2014 if new information is available or create additional studies	We are creating video case studies in 2019 and have plans to replace some of the older ones. The video case studies will also be repurposed into a paper/handout case study.
Project Data: Establish one protocol for using the custom designation and apply it across Pacific Power's, the program administrators', and their subcontractors' project data.	Implemented. The measure library was updated to use the same field to designate the custom measures. Projects started prior to the update may still have inconsistencies in which field has the custom

Evaluation Recommendations	Pacific Power Response
	designation. Once all projects started prior to the update are completed, the inconsistencies will be addressed.
Project Data: Include contact information for participants in the Instant Incentives offer, in the program participant database provided to the program evaluation team.	Implemented. Customer participant contact information (phone and/or email) is being consistently collected and uploaded into the company database and the report provided to the program evaluation team has been fixed to pull this data from the database.